

Better Subbases and Bases for  
Bituminous Pavements page 104

May, 1961

# ***ROADS<sup>AND</sup>STREETS***

A GILLETTE PUBLICATION





## **PERFECT COMPACTION...EVERY TIME**

### **Rapidly and at lowest cost!**

Note the compacted area in the photo above. It's exceptionally smooth, compacted to specified density from its firm surface to the required depth. And the JACKSON had no difficulty, whatever, in staying ahead of the spreader. On any job of granular soil compacting from sand to rock as used in base courses or fills the JACKSON offers the best means of achieving specified densities at lowest cost. Each of the compactor units provides 4200 3-TON BLOWS PER MINUTE. The JACKSON functions equally

well in either direction . . . no turning or deadheading required. And when occasion dictates, each of the compactor units can be fitted with an operating handle and used as a self-propelling compactor to compact the tight places other equipment cannot reach. It's the most versatile machine of its kind on the market. Both operating and maintenance costs are extremely low. And the JACKSON service organization goes sled-length in seeing to it that you get maximum benefit from the machine.

## **RENT the JACKSON MULTIPLE COMPACTOR**

from your local distributor. It's the no-risk way of discovering the fastest, most effective and economical method of compacting all granular soils and soil-cement mixes.



Working width is 13', 3". The two outer units on either side may be raised and made inoperative to suit narrower coverage requirements.



Changing to the 88" width, overall, for road travel or maneuverability around other equipment is accomplished hydraulically in 30 seconds.



The new widening attachment (optional at added cost) is raised or lowered instantly . . . ideal for widening projects.

# **JACKSON VIBRATORS, INC.**

LUDINGTON,

MICHIGAN





## Pavers set new daily record in Michigan

Denton Construction Co. personnel on the job. Left to right, L. M. Denton, president; Mickey Palmer, job superintendent; Charles Leduman, general superintendent; and Richard Mitte, paving foreman.



These four paving machines set a new national record of 8,036 ft laid in a single day. Bethlehem road steel products were used in the record stretch.

### 1½ miles of 2-lane highway placed with Bethlehem paving steels

A new national record for concrete road pavement laid in one day was set on August 25, 1960, by Denton Construction Co., Grosse Pointe Woods, Michigan.

Working on US 27 north of Indian River, the company placed 8,036 ft of 24-ft wide, 9-in. deep concrete in a 12-hour day. Four paving machines were used to lay the 1.52 miles of two-lane highway.

The paving steels used by Denton—dowel units, hook bolts, base plates, mesh, and reinforcing bars—were all supplied by Bethlehem Steel.



For strength  
... economy  
... versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.  
Export Sales: Bethlehem Steel Export Corporation

# BETHLEHEM STEEL



ROADS AND STREETS, May, 1961

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# ROADS AND STREETS

MAY, 1961

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

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## FRONT COVER SCENE

Catching one of Harrison's Construction Company's Euclid rear-dumps on the firm's 8,000,000-yards runway grading jobs for Pittsburgh Greater Airport. Systematic servicing was done by stopping the equipment along the work. Harrison's heavy duty lube trucks also carried water, fuel, compressor and floodlights.



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GOOD YEAR

# UP FOR A BIG BID?

Let Goodyear keep  
your tire costs down

**FINDING THE WORK FACTORS**—Goodyear Big-Tire Specialists are prepared to analyze your tire needs with an eye to keeping costs under control. These specialists will check the terrain, loads, climate, roads, schedules and speed problems that confront you, and can select the right Goodyear tires to help you solve them.

**PUTTING BIG-TIRE KNOW-HOW TO WORK**—From the world's greatest wealth of experience, Goodyear Big-Tire Specialists are uniquely qualified to help you. And they'll provide the best in tread and body designs to help safeguard your contract and your profits.

**SETTING UP BIG-TIRE SERVICE**—You say the word, and Goodyear Big-Tire Specialists will set up a tire-maintenance program at the job-site to help save you man-hours, machine-hours and useful tire life. In addition, Goodyear Contractor Service *will travel* with your job—handle all your tire maintenance and repair needs.

#### With BIG-TIRE PERFORMANCE

##### Example: SUPER HARD ROCK LUG

Here's one of Goodyear's Big Tires for the Big Bid you have coming up. It's the SUPER HARD ROCK LUG, built for heavy loads and no roads to make the going easy. Triple-tough 3-T Nylon Cord for the greatest tire stamina, plus new, special cut-shrugging rubber compounds, make this tire a real cost-saver in the roughest off-highway service.

For details on this and other Goodyear special-duty tires, and the Goodyear Contractor Service, see your Goodyear dealer. Or write Goodyear, Truck Tire Dept., Akron 16, Ohio.

Lots of good things come from

# GOOD YEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

ROADS AND STREETS, May, 1961

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# IS THIS CONCRETE PAVING ...TOMORROW?



Copyright 1961 - CHAIN Belt Co.



**Is this it? The road paving method of the future? Road paving so highly developed and automated just one machine takes over the complete job from base preparation through mixing of the concrete to final, finished surface.**

Who knows? But if this is the ultimate in concrete paving, this you can be certain of: **Rex will be the first with it!**

New ideas and concepts are constantly being explored by Rex—the specialist in concrete paving equipment. It is this long look ahead which Rex, as the leader in concrete

paving equipment, has constantly in sight that puts at your command today the finest, most advanced and productive in concrete paving equipment.

No other line offers such a range of time- and job-speeding advancements!

## REX PUTS YOU AHEAD TODAY!

This is a concrete example of Rex leadership—another exclusive product for speeding concrete projects while saving substantially in costs.

This is the new Rex Combination Spreader-Finisher-Float—already in use by profit-conscious contractors. This remarkable development, in one machine with one operator, combines three separate operations. The savings are obvious.

Indeed, whatever your requirements are now to do today's concrete paving at higher profits, Rex has the ready answer:

• Rex Pavers • Rex Slip-Form Pavers • Rex Central-Mix Paving Plants • Rex Spreaders, Finishers, Floats • Rex Curing Machines • Rex Subgrade Planers and Testers • Rex Forms • Rex Truck Mixers • Rex Portable Batching Plants.

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**WHAT ARE YOUR NEEDS?** Let the industry's most experienced concrete paving specialists help you. Ask your Rex distributor for details on Rex equipment or write for complete, illustrated catalogs. **CHAIN Belt Company,** 4652 W. Greenfield Ave., Milwaukee 1, Wis.  
In Canada: **Rex Chainbelt (Canada) Ltd.,** 1181 Sheppard Ave. East, Willowdale, Ontario.

# REX®

**CONSTRUCTION MACHINERY**

# "Trouble-Free"

HIGH PRODUCTION-POST and  
STEEL RAIL DRIVING with  
**STERLING  
DRIVERS** ... all  
hydraulic

4 x 6 post  
machines have driven over 60,000  
of Pennsylvania, Tennessee, Connecticut,  
and New York.

They have been operating to our complete satisfaction being fast, efficient and giving us trouble-free operation under most severe working conditions.

Yours truly,  
**WEBSTER & WEBSTER, INC.**

*Albert C. Bielitz*  
Albert C.  
Bielitz  
Treasurer

**WEBSTER and WEBSTER, Incorporated**  
*Fence and Guard Rail Contractors*

1366 MAIN STREET • EAST HARTFORD 8, CONNECTICUT

February 28, 1961

Wyoming Valley Equipment Co.  
714 Wyoming Avenue  
Kingston, Pennsylvania

Gentlemen:

Attn: Mr. Frank Serino

Please be advised that our company has purchased from Wyoming Valley Equipment Co. three Two-In-One Sterling Combination Driver and Pounders and one Sterling Self-contained Driver. Both of these type Drivers have worked out to our complete satisfaction from the viewpoint of efficiency of operation and the ability to perform the work to rigid state specifications.

Our company recently used these machines for the installation of Highway Beam Guard Railing on the Pennsylvania-Canada Expressway, and on this single job two of these machines drove 10,000 steel "M" Column 4 x 6 posts. During the past two years these four machines have driven over 60,000 posts in the states of Pennsylvania, Tennessee, Connecticut, Massachusetts.



The STERLING DRIVER, on turntable, fore and aft body is quickly and accurately positioned within 180° for "on-the-road" operation.

All Hydraulic system with center bank controls. Hyd. pump powered by Wisconsin Air-Cooled 37 HP engine. Driver develops 10,000 lb. impact. Rugged, tubular frame assures positive alignment. Compact mounting for fast, over-the-road travel.

SALES and SERVICE

**WYOMING VALLEY EQUIPMENT DIVISION**  
714 Wyoming Ave., Kingston, Pa. • Tel. BUTler 7-3158

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FOR DETAILS AND  
DEMONSTRATION

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## ROADS AND STREETS

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ROADS AND STREETS, May, 1961



## *Building Longer Life into a Busy Bridge with* **LACLEDE REINFORCING STEELS**

There are busy days ahead for this well constructed bridge. As part of a major Louisiana highway system, it will carry streams of automobile and truck traffic over the West Atchafalaya Floodway at Krotz Springs. Blount Bros., Inc., are building it for the Louisiana Department of Highways.

This bridge will give many years of useful service because, like so many other Federal and State highway projects, it's strengthened with Laclede Reinforcing Steels.

Laclede offers a complete selection of steel products for every highway reinforcement need: welded wire fabric, multi-rib bars, welded dowel spacers, prestressing strand, center and recess joints. All are made in Laclede's own mills, from quality open-hearth steel, by the most modern processes and equipment.



**LACLEDE STEEL COMPANY**

SAINT LOUIS, MISSOURI

Producers of Steel for Industry and Construction

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**ROADS AND STREETS, May, 1961**

# GET REAL PRODUCTIVITY



Is there a difference in Diesels?

Ask Wilmer Lean, Patrol Superintendent of Wisconsin's Walworth County Highway Department, that question and you'll get a big "Yes!"

And Mr. Lean has on-the-job proof to back up his opinion.

For he pulled a competitive Diesel out of an Austin-Western 99H grader last year, replaced it with a "4-71" GM Diesel.

Result? "The '4-71' has doubled the

work capacity of this unit," Mr. Lean says. Adds, "We now have four graders powered by GM Diesels in use and we're adding another 'Jimmy' by repowering an Oshkosh utility truck."

It's easy to see why a GM Diesel-powered grader will 'doze, cast, plane and crown faster than a grader powered by any other Diesel. A "Jimmy" delivers power on every piston downstroke—accelerates faster to pick up the load "right now."

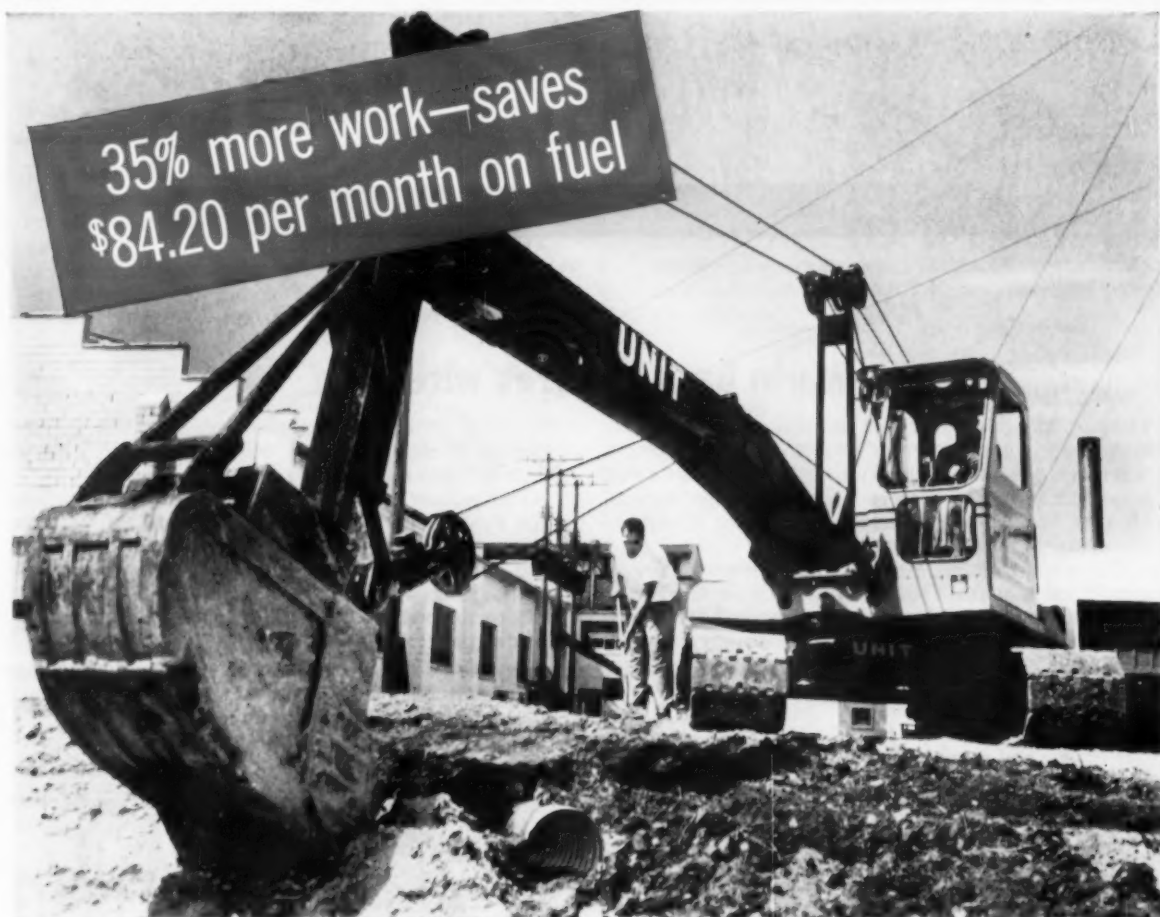
This means you get more work done in less time—or the same amount of work done with fewer pieces of equipment. Either way you save big money in capital investment and operating expenses.

Want to know more? Your GM Diesel Distributor has the answers. He's part of a coast-to-coast network of "engine people" you'll find in the Yellow Pages under "Engines, Diesel." Or mail the postcard.

## GM DIESEL ALL-PURPOSE



# GET A GM DIESEL ENGINE



When you switch to Diesel, you're sure to save money on fuel.

And when you use a "Jimmy" Diesel, you'll get a big bonus, too—increased productivity.

Louis C. Hoffman & Son of Cedarburg, Wisconsin, can prove it for you. They have a #617 Unit backhoe powered by a "3-53" GM Diesel working alongside a similar machine powered by a 6-cylinder gasoline engine.

The "Jimmy" uses only 13 gallons of 15¢

fuel a day . . . the gasoline unit uses 22 gallons of 28¢ fuel. Working 20 days a month, the GM Diesel-powered backhoe saves \$84.20.

But the big plus is the 35% extra productivity. As Partner Roman Hoffman says: "This unit is highly maneuverable, does all the jobs we give it without 'pain or strain.' Compared with the other machine, it does approximately one-third more work at two-thirds the cost per day."

If that's what you'd like to be able to say about *your* equipment, see your GM Diesel Distributor. He's part of a coast-to-coast network of "engine people" you'll find in the Yellow Pages under "Engines, Diesel." Or mail the postcard.

## POWER LINE

Sets the  
standard of  
Diesel  
productivity

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**ROADS AND STREETS, May, 1961**



## GM DIESEL

DETROIT DIESEL ENGINE DIVISION,  
GENERAL MOTORS, DETROIT 28, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario,  
Parts and Service Worldwide

# LUBE LOGIC 5 new ways



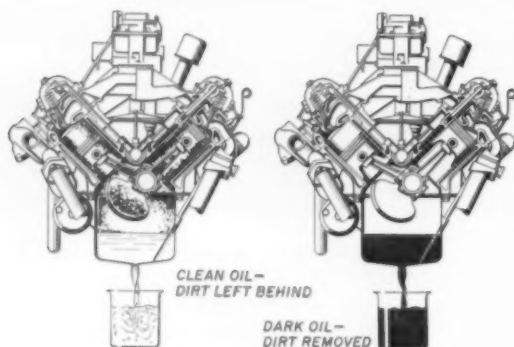
## Warm bath restores wire rope

The best way to get lubricant inside a cable, where it's really needed, is to immerse the cable or wire rope every 500 hours or so in a bath of warmed-up Texaco Crater A lubricant. It pays off by giving you far longer service life than you would get simply by applying Crater A externally.

This warm-bath treatment requires a horizontal trough to hold the lubricant. The trough should be fitted with pulleys to keep the cable completely submerged while it's passing through. A burlap collar should be rigged to wipe

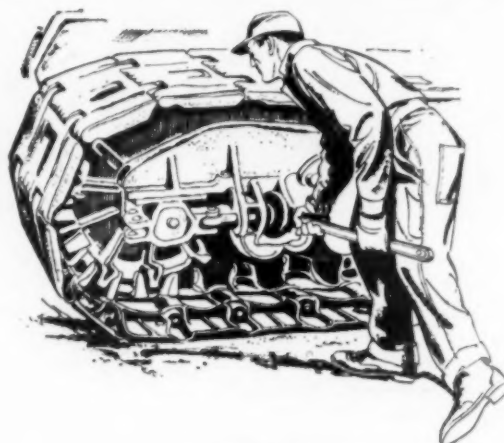
off excess lubricant as the cable leaves the box. An immersion of about a minute will allow the lubricant to work well into the strands.

This process is *not* an alternative to other lubrication. You should continue to clean the cable and apply Crater A externally every 10 to 100 hours, depending on the type of work the cable is doing. Remember also to be very sparing with lubricants on cables that wind on clutch-equipped drums, and never lubricate cables that are dragged in dirt.



## Dark engine oil... sign of a hard worker

Here's a motor-oil misconception that's still common enough to need discussion. Some folks think that the better an engine oil is, the more likely it is to come out as clean as it went in. The truth of the matter is just the other way around. A good detergent-dispersant oil holds onto dirt like an old friend. It keeps dust, soot and carbon in suspension, and carries it out of the engine when you drain the oil. Oil that looks clean when you drain it from the crankcase is a sign that these contaminants may still be inside the engine. Moral: oil that darkens in use is really doing its job.



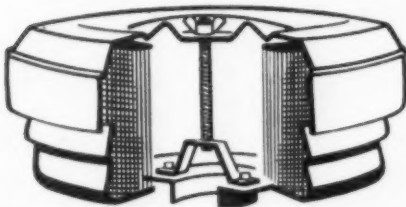
## No-sweat way to adjust crawler treads

Crawler treads are easier to adjust if you dab a little Texaco Threadtex on the adjusting screws. The Threadtex stays put through months of service, keeps the screws free-turning and corrosive-proof. Another good use for Threadtex is on track bolts, when you're making up track. A little dab of Threadtex on the bolts will save a lot of time and work in taking down track after it has been in service.

# to trim downtime

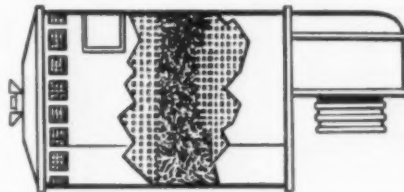
## Key points on air filter maintenance

In a day's operation a typical engine inhales several thousand cubic feet of air, and on a construction project all that air is probably loaded with abrasive dirt and dust. Good air-filter maintenance is the only way to make sure your engine gets the air and *not* the dirt. Here are some maintenance tips that will keep your air filter working better through thick and thin.



**Dry type air cleaners** (the ones with the fluted paper element) should simply be shaken or tapped lightly to remove dirt, and reinstalled. Never clean dry-type elements with kerosine or diesel fuel.

Additional precautions: empty centrifugal pre-cleaners when the glass container is half full; don't remove the oil cup when the engine is running.



If your filter is the wire gauze type, and you want to re-use the element, wash the gauze in kerosine or diesel fuel, shake it dry (*don't* blow it with compressed air) and re-oil it with SAE 40 or SAE 50 oil to coat the element.



**Oil-bath type air filters** won't function properly if there's more than a half inch of sediment at the bottom of the oil reservoir. Check the sediment level by sticking a screw-driver down into the oil, and if you're anywhere near the half-inch level the bowl should be cleaned out and refilled. Also, inspect the filter every 5 to 50 hours to make sure the oil itself is at the right level. Every 500 hours the whole cleaner should be dismantled and cleaned, and refilled with new engine oil of the same grade used in the crankcase.

## New Texaco movie can help boost your profits



This factual, down-to-earth presentation shows you how 1% of your total budget (the amount usually spent on lubricants) can minimize a major cause of equipment downtime.

**SEE:** How the biggest engineering job ever undertaken was 90% lubricated with only *four* different products.

**SEE:** How one contractor lubricated 21 different types of equipment with only seven products.

**SEE:** "A Plan for Profits"—Texaco's newest sound and color movie.

**FOR AN EARLY SHOWING** contact your Texaco Contractor Representative *now*.

## TEXACO LUBRICATION ENGINEERS

Every month or so we'll bring you a batch of "sleepers"—little angles, so easy to overlook, where big savings in time and money can be made. But month in, month out, your local Texaco Man is your best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

TUNE IN: TEXACO HUNTLEY-BRINKLEY REPORT, MON. THROUGH FRI.—NBC-TV

**TEXACO**  
Throughout the United States  
Canada • Latin America • West Africa





*When his fleet of four crawler dozers failed to maintain production behind eight draglines, this prominent sewer contractor tried a rubber-tired unit. Today:*

## **One Michigan does**

The one Michigan Model 280 Tractor Dozer you see here is, *by itself*, handling all backfilling behind *eight* sewer-digging draglines. It has released *four* crawler dozers for other work, eliminated the need for a lowboy truck, and sidelined a compactor formerly used on the trenchfill.

The job is a \$2,000,000 network of sewer and water lines for the City of Bloomington, Minnesota. The contractor: Lametti & Sons, Inc., St. Paul.

"When we first tried the Michigan" recalls Bob Larson, veteran superintendent for Lametti, "both we and our Michigan distributor, Road Machinery & Supplies Co., Minneapolis, expected the 262 hp machine to produce only

about as much as *one* of our 235 hp crawlers. But, particularly because the Michigan is so much faster on the return portion of each dozing cycle, it has *outproduced two of them*. And with its ability to travel quickly under its own power between locations it has had no trouble keeping *all backfilling cleaned up behind eight draglines!*"

### **Travels 35 miles daily between jobs**

Because of the wide area over which the draglines work—about four miles square—the 28 mph Michigan travels up to 35 miles daily between job locations . . . spends an average 20 minutes at each site dozing the 2700 lb-yd sand

material up to 200 ft.

To do this job originally, two crawlers—both 235 hp—had to be lowboy-transported from location to location, and two smaller crawlers—70 and 100 hp—had to be kept at one station each. The big trouble was that the lowboy never seemed to be in the right spot at the right time. The big crawlers spent half their time waiting. The Michigan, of course, doesn't have to wait for transportation, and it has kept production high continually.

### **Gets 100% compaction on normal dozing passes**

There have been other benefits too! One is compaction. *In just normal dozing*



Where sand has to be dozed 200 ft into trenches, Michigan's fast push and fast return enable it to out-produce two similar-sized crawlers.



↑ Low-pressure tires and excellent maneuverability keep lawn damage to a minimum.

→ In this abrasive sand, Lametti estimates tires will outlast tracks, six to one!

A big advantage of Michigan over crawlers is its ability to make fast self-powered moves between trenching locations.



## work of 6 machines

operation, the 57,770 lb Tractor Dozer has compacted the fill to original density.

"When we used crawlers to backfill, we either had to load out about 10% of the material or use a vibratory compactor," Mr. Larson points out. "And with the compactor we were always worrying about a broken sewer line . . . something we don't fear from the Michigan's big (29.5-25) tires."

The speedy Michigan has also proved handy for such odd jobs as moving manhole covers . . . pulling out stuck draglines . . . and by chaining backhoe and bucket attachments to its blade, providing the transportation services formerly done by truck and lowboy.

Still more tasks are soon to be added . . . for more details circle 287 on enclosed return postal card

**ROADS AND STREETS, May, 1961**

to the busy Michigan's schedule . . . among them, scarifying asphalt streets to make digging easier for draglines, and with an angle-blade side-casting fill over water line trenches.

### Residents like quick work, contractors like 100% availability

"Michigan ability to keep backfilling cleaned up puts us in good with the local residents," adds Mr. Larson. "It works so fast we're in and out in one day and no driveways are blocked at night. Also, compaction by the Michigan makes it easy for traffic to move over the trenchfill even in rainy weather.

Then too, in these narrow streets we

occasionally have to drive on someone's lawn and we find the Michigan's tires don't tear them up as do crawlers."

He continues, "Another reason we're pleased with the Michigan is excellent availability it's given us from the beginning. It's a great machine for our kind of work; we sure wouldn't like to be without it!"

Michigan is a registered trademark of  
**CLARK EQUIPMENT COMPANY**  
Construction Machinery Division

**CLARK**  
EQUIPMENT

2497 Pipestone Road  
Benton Harbor 14, Michigan  
In Canada:  
Canadian Clark, Ltd.  
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**'61 FORD TANDEM  
AXLE TRUCKS**  
**BROADER WARRANTIES...**  
**GREATER DURABILITY...**  
**BIGGER CHOICE!**



FORD DIVISION, *Ford Motor Company,*

**FORD HAS WARRANTED TO ITS DEALERS, WHO IN TURN WARRANT TO YOU:**

- **New Super Duty V-8 Engines for 100,000 miles or 24 months!**
- **New Ford Trucks for 12,000 miles or 12 months!**

Ford's rigid quality control program gives you unsurpassed dependability! Positive evidence of uniformly high production and inspection standards is the exclusive new 100,000-mile engine warranty. On 401-, 477- and 534-cu. in. Super Duty V-8 engines, each major engine part (including block, heads, crankshaft, valves, pistons, rings), when engine is used in normal service, is warranted by your dealer against defects in material or workmanship for 100,000 miles or 24 months, whichever comes first. Warranty covers the full cost of replacement parts . . . full labor costs for the first year or

50,000 miles, sliding percentage scale thereafter.

In addition, an extended warranty covers all 1961 Ford Trucks of any size. Each part, except tires and tubes, is now warranted by your dealer against defects in material or workmanship for 12 months or 12,000 miles, whichever comes first. The warranty does not apply, of course, to normal maintenance service or to the replacement as normal maintenance of such items as filters, spark plugs and ignition points. *No other trucks give you such protection for your investment; never before could you be so confident of long-range durability!*



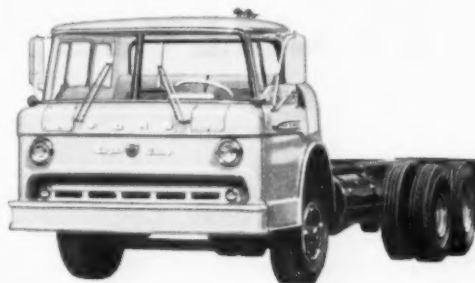
**Tougher tandems** offer greater strength in chassis, cab and sheet metal for longer life. Full-Torque fly-wheel power take-off is available for more efficient drive of transit mixers and heavy-duty equipment.



**Timken or Eaton rear axles**, with capacities up to 38,000 lb., are available in all Super Duty tandems. High capacity front axles have wider track for increased stability when cornering or in rough terrain.



**GVW's up to 51,000 pounds** permit big, profitable payloads. Heavier gauge metal and stress-isolating independent mounting for radiator, fenders and cab give you greater durability.



**Tandem Axle models** are available with tilt cabs. As with conventional tandems, aluminum walking beams, wheels and fuel tanks are offered to cut weight . . . increase payload capacity.

**QUALITY-BUILT...  
MAINTENANCE-  
ENGINEERED**

...for more details circle 311 on enclosed return postal card

**ROADS AND STREETS, May, 1961**

**FORD TRUCKS COST LESS**

# A Mud Problem?



## USE KOMPACTOR

THE CHEMICAL AID TO SOIL CONTROL

For detailed  
descriptive brochure,  
write or phone . . . . .

After KOMPACTOR treatment most dirt roads will be passable in wettest weather. Applied with standard sprinkling equipment, KOMPACTOR, when used as directed, cures most mud problems effectively and for years to come!

KOMPACTOR is not a soil cement; instead it removes from the soil many of the unfavorable properties that reduce the coefficient of friction of the soil — the real reason for most impassable roads.

ANOTHER *REYNOLDS* FORMULA

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18

ROADS AND STREETS, May, 1961



## ROADS AND STREETS

Sixty-Nine years of Editorial Leadership

# Washington News Letter

By Duane L. Cronk, Director, Highway Information Services

May 10, 1961

The prospects for putting the National Highway Program back onto something close to the original 1956 schedule look better this month. As this is written, the House Public Works and Ways and Means Committees have reached agreement on an accelerated financing proposal and the ways are being greased to launch it.

In essence, it would stretch out the program for two years. But considering how much the cost of the 41,000-mile Interstate System program has been boosted, such a stretch out would not mean a lowering of roadbuilding volume. In fact, the revenue measures the House Committees have decided upon would produce \$900 million a year of the new money needed. This is almost enough to meet President Kennedy's program request.

Compromise was the order of the day. The committeemen pieced together a plan which will please no one entirely and hurt no one unreasonably. The federal gasoline tax would not be repealed as some wished, nor increased as some requested, but extended at the current 4¢ level. The Administration's request for \$300 million worth of new truck taxes would be cut to \$150 million. The Congressmen would dip into the general fund, also, for \$150 million federal excise tax money on trucks and buses; this move will displease both the Administration and automobile manufacturers, but satisfy the American Automobile Association. In short, the committee plan reflects the traditional Ways and Means philosophy, namely that tax measures are creations of expediency, not equity.

\* \* \*

The construction industry's representatives here are satisfied that this is as good as could have been expected from the House Committees, perhaps better. Speaking for the American Road Builders Association, Executive Vice President Louis Prentiss said:

"This isn't the ideal solution, but it is acceptable. With closer coordination of right-of-way acquisition, preliminary planning and engineering, and letting of contracts, it may be possible to achieve substantial completion of the Interstate System by the end of 1972. In short, although this plan falls short of our determined needs, it is a sound, both-feet-on-the-ground approach to the highway financing dilemma."

The next step is for Congressman George Fallon, chairman of the House Subcommittee on Roads, to introduce a "clean" bill, containing his schedule of increased authorizations as Title I and the financing proposals informally agreed upon as Title II. With the endorsement of both the powerful Ways and Means and Public Works Committees, this measure could conceivably be brought to the floor

(continued on next page)

for debate within a matter of days.

Even those most elated over the Committee measure do not minimize the rough treatment ahead when other Congressmen, less informed about highway needs or influenced to represent the special interests adversely affected, will get a chance to criticize the measure or reject it outright. It can be expected that every derogatory sentiment about the highway program read in the press during recent months will be repeated and embellished by Congressmen who will have their own reasons for doing so.

However, by drafting a bill which spreads the new tax burden much wider than the Administration had proposed - right or wrong - the House committees will at least offer a proposal to their colleagues which stands about the best possible chance of general acceptance.

\* \* \*

BPR statisticians have analyzed 7,098 construction contracts awarded under the federal-aid highway program last year, to determine trends in competition and contract size. Their findings . . .

The \$3.1 billion worth of work let during 1960 represents a solid 25% increase over 1959 awards.

Competition for contracts was somewhat less keen - 6.9 bidders per job, compared to 7.7 in 1959. State averages varied from 4.4 and 4.6 in Nebraska and Hawaii to 11.2 in Tennessee.

Low bids were 10.5% under engineers' estimates, compared to 11.8% in 1959. Bids were under in all states, ranging from 1.1% under in Colorado to 19.7% under in Mississippi.

Some 42% of contracts awarded were for amounts less than \$100,000, indicating, BPR officials say, that the highway program is still a good market for small business.

\* \* \*

The nation needs 465 new airports and improvements at 2,834 others during the next five years, the U.S. Federal Aviation Agency reported last month. Right-of-way and construction of such facilities would cost \$1.1 billion, nearly 34% of which \$331 million would go for paving of runways, taxiways and aprons.

The appeal of ARBA and AGC for a federal-aid step-up for this kind of construction has helped stimulate some Congressional action. Chairman A.S. Monroney of the Senate Aviation Committee has drafted a proposal calling for \$100 million a year in federal money for this program, beginning July 1.

The Administration has formally asked Congress to create a new department of Housing and Urban Affairs. This, if adopted, would stimulate a great deal more federal attention to such problems as urban area transportation. And, in time, it would lead to a show-down between automotive-highway interests and rail transit interests over which form the federal government should support. Politicians are well aware that national population growth is in metropolitan areas, and that here is where transportation needs are the greatest. It is only a matter of time, many believe, until Uncle Sam will be dealing directly with cities in federal-aid transportation matters (including highways) in states where legislatures are not moving fast enough to satisfy these communities.

# REO



## REO TANDEMS... the talk of the transit mix business

Word gets around fast. Reo's rear axles can haul more payload—legally—because of lower rear chassis weight and unique front axle placement. You get another 400 to 600 lbs. of payload capacity with Reo's low cost, *flywheel power take-off*—installed as an integral part of the chassis engine drive. But that's not all. Reo's *Gold Comet* engine goes the life of the truck without cylinder re-boring or block replacement—thanks to exclusive "wet sleeve" construction. *ReoMatic transmission*—fully proved, fully automatic—helps speed delivery schedules by eliminating power interruption and gear shift guesswork; prevents harmful engine lugging, too, and minimizes the chance of drive line damage. Better get the complete Reo story before you buy.

*Gold Standard of Values*



REO MOTOR TRUCK DIVISION • THE WHITE MOTOR COMPANY, LANSING 20, MICHIGAN



The T-340 has the capacity to handle stockpiling and clean-up work. Big 85-inch blade with 32-inch spillboard holds the heap. Operator changes the angle or tilt of the hydraulic Bullgrader<sup>®</sup> on-the-go without ever leaving the tractor seat.

## You'd never expect to do so much with an "under 50 hp" crawler!

**Even under the most adverse conditions** the 47 hp\* International<sup>®</sup> T-340 crawler is a heavy producer. More than three tons of drawbar pull or push are balanced with long track length for excellent traction and flotation in the worst footing.

**Handling ease** with exclusive planetary steering helps the T-340 near the production of larger crawlers costing thousands of dollars more. Optional Fast Reverser almost eliminates gear shifting and slashes cycle time on shuttle-type work.

**Ask your nearby IH dealer to demonstrate** an International T-340 on your next job. You'll be surprised—and pleased—at how much work this rugged 47 hp go-getter will do.

*\*Maximum engine horsepower at standard conditions*

**Cut through stubborn clay** or sticky gumbo with non-spin traction. In any material the T-340 gets heaping loads quickly in cycle—speeding second and third gear ranges at 2.2 to 3 mph.



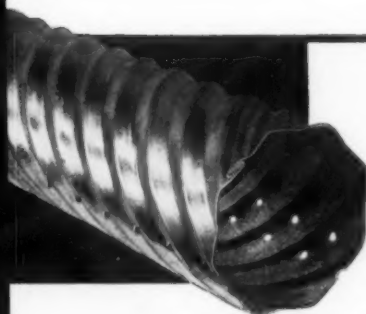
**Precision grading ability** of the T-340 helped slash stadium construction costs at the new Charlotte, N. C., stock car speedway. The IH crawler graded for 50,000 stadium seats.







A 25% SAVINGS in time and labor costs was recently chalked up by a Pittsburgh contractor on this LOK-COR installation.



**CHECK THE FEATURES  
YOU WANT...  
LOK-COR HAS THEM ALL**

- Economical...easy to install
- Positive double lock seam
- Helically corrugated for strength
- Corrosion resistant, full 2-ounce galvanized coating
- Furnished perforated or non-perforated
- Meets all current specifications
- Available in 6", 8", and 10" diameters, 16 and 18 gage ... 20' lengths
- Made from highest quality Republic Continuous Galvanized Copper Steel

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## SUBDRAINAGE SAVINGS BEGIN RIGHT HERE

*No other type of Subdrainage Pipe goes in as fast and easy as New Republic LOK-COR*

Major highway job, or secondary road, new Republic LOK-COR Subdrainage Pipe will reduce your costs, and greatly speed subdrainage installation. This permits you to proceed with and complete other phases of your construction schedule at an earlier date. Here's how LOK-COR does it:

Installation is three ways faster. (1) LOK-COR can be installed in a much narrower trench because connections need not be made in the excavation; (2) a LOK-COR system can be completely assembled at ground level on temporary supports, then progressively lowered into place; (3) LOK-COR comes in easy-to-handle 20-foot sections with fast-joining fittings and couplings. And LOK-COR is carried in stock, ready for immediate shipment to your job.

Performance standards move up, too. LOK-COR prevents the forming of roadbed water pockets, is effective against seepage planes which cause slides. Exclusive double lock seam will neither unravel nor become disconnected to interrupt service.

Send the coupon for complete information on LOK-COR Subdrainage Pipe, or contact your nearest Republic Drainage Products Distributor.



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☐ The complete line of Republic Drainage Products

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Company \_\_\_\_\_  
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City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

# People

JOHN F. WILLIS, engineer of structures, Connecticut state highway department, has retired after 43 years of service with the department.

As was noted during a farewell dinner given in his honor and attended by Commissioner Howard S. Ives and other top dignitaries, Mr. Willis has had a hand in more of his state's bridges than any other single person, these structures including some of the state's largest and several which have won prizes for their design.

Willis is nationally known in bridge engineering circles through his committee activities with ASCE, ASTM and the American Welding Society.

NEIL WELDEN, veteran career man with the Iowa highway com-



Neil Welden

mission since 1933, is retiring as bridge engineer, a post he has held since 1954. Charles Pestotnik of the commission's bridge staff succeeds to this position. Welden's work in

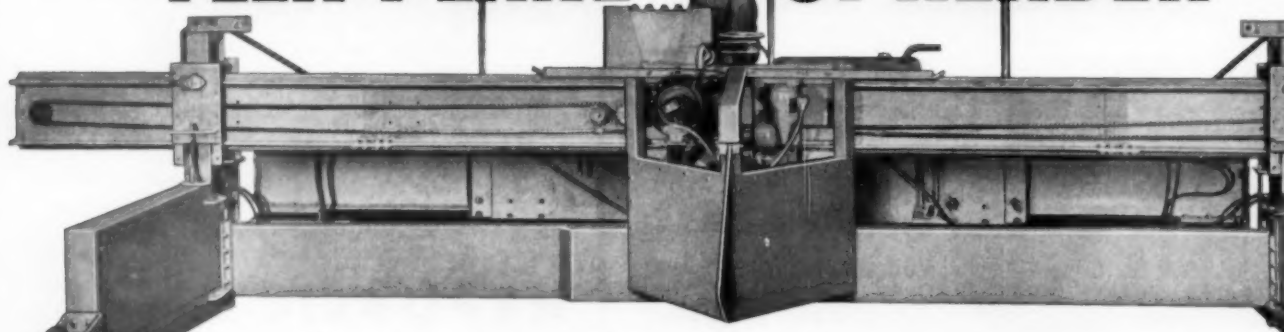
highway bridges has won him national recognition.

W. H. O'DONLEY, Vice President of Massman Construction Company has been elected President of the Associated General Contractors of Missouri for 1961. O'Donley who heads his company's St. Louis office has been active in the association for many years.

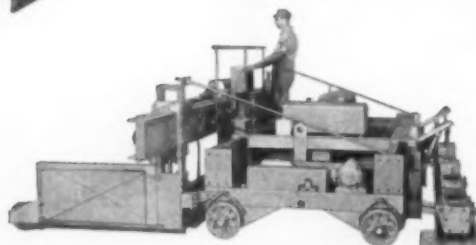
MURRAY A. WILSON, a consulting engineer of Salina, Kansas, has been nominated president of the National Society of Professional Engineers for 1961.

Mr. Wilson, who established the consulting firm of Wilson & Company in 1941, holds engineering degrees from Kansas State University, and an honorary doctor's de-

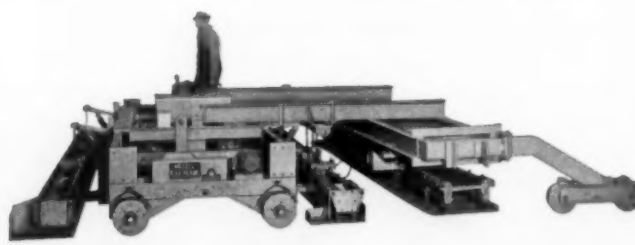
## NEW FLEX-PLANE SPREADER



← FEATURES SELF-CONTAINED HYDRAULIC WIDENING →



**CONCRETE SPREADER** — CHOICE OF TRACTION DRIVES. GAS-ELECTRIC — Infinite speeds in forward or reverse from 0 to 60 F.P.M. MECHANICAL TRANSMISSION — 10 forward speeds — maximum 77.8 F.P.M. — and 10 speeds in reverse.



**COMBINATION FINISHER-FLOAT** — Two pieces of paving equipment in one. Frames can be extended manually or hydraulically from 12' to 26'. Gas-electric powered — separate screed and traction drives. (Send for Bulletin 59-5.)

gree from Kansas Wesleyan University. He has served as president of the Kansas Engineering Society and the Kansas Section of the American Society of Civil Engineers. Has also been a member of the ECPD Engineering College Accrediting Committee for Region V, the Kansas State College Research Foundation, and the Governor's Advisory Committee of Flood Control.

WARREN D. FISH, CHIEF, Construction Administration Branch, Bureau of Public Roads, has retired after 27 years in Federal Government service all with BPR. He is the author of numerous technical bulletins and engineering articles, and recently was given a cash reward for national leadership and "sustained superior performance" as chief of his branch.

HAROLD W. HANSEN has been appointed Senior Planning Engineer,

Paving Division, Portland Cement Association. Mr. Hansen joined the Association recently after 20 years of diversified experience with the Minnesota department of highways, the Corps of Engineers, the Bureau of Public Roads, the Automotive Safety Foundation and as vice president of Triangle Construction Company.

SILAS N. PEARMAN, heretofore, state highway engineer of South Carolina has been advanced to Commissioner. He takes over the work of C. R. McMillan, who has relinquished this job due to health reasons. Pearman has been state highway engineer for fourteen years.

J. P. SILVESTRI, of Charles L. Harney, Inc., is the 1961 President of the Associated General Contractor's Northern and Central California chapter.

H. E. LORE, manager, Machinery Division of Dravo Corporation, Pittsburgh, has been elected president of the National Constructors Association. The Association is composed of nationally known engineering and construction firms engaged in designing and building steel, chemical, petroleum and power plants, and other heavy construction and industrial facilities.

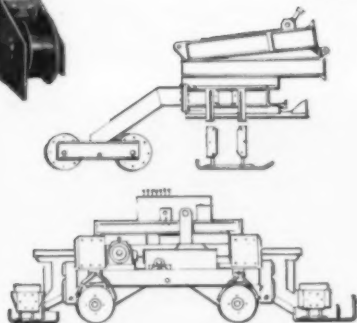
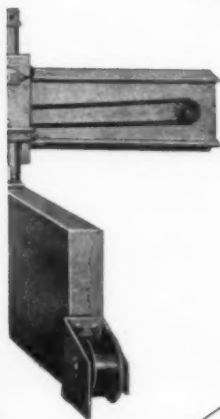
WALTON E. BEDINGER, JR., of Sioux City, president of the Hobe Engineering Corporation, is 1961 president of the Associated General Contractors of Iowa. Other officers are: Wood W. Weaver, president of Weaver Construction Co., Iowa Falls, re-elected vice-president; G. A. Parish, vice-president of Spencer Construction Co., Spencer, elected vice-president; and Irving F. Jensen, partner in Irving F. Jensen Co., Sioux City, named Association treasurer. O. W. Crowley, Des Moines continues as executive secretary.

## another great addition

to Heltzel's line of paving equipment.

Working widths from 12' to 26' at speeds up to 77.8 feet per minute. Operator has complete control over spreading action—sweep can be stopped at any position and direction reversed. Features gas-electric power with separate motors and controls for screed, sweep, and traction drive. Pneumatic tired wheels for easy transport are optional. Can also be equipped with vibrator attachment mounted on sweep or screed.

For complete information about the new FLEX-PLANE SPREADER or other FLEX-PLANE finishing equipment, see your local Heltzel distributor. Write today for descriptive literature.



Finisher or float trailer can be purchased separately. Finisher section can be used singly as twin-screed finisher.



**AUTOMATIC SPRAY-CURING MACHINE**—Fast, economical method for applying membrane curing compound. Spray head is synchronized to machine travel for skip-proof, overlapping coverage. (Send for Bulletin 59-17.)

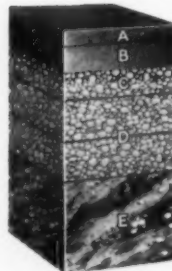
# HELTZEL FLEX-PLANE

THE HELTZEL STEEL FORM & IRON CO.  
WARREN, OHIO

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**ROADS AND STREETS, May, 1961**

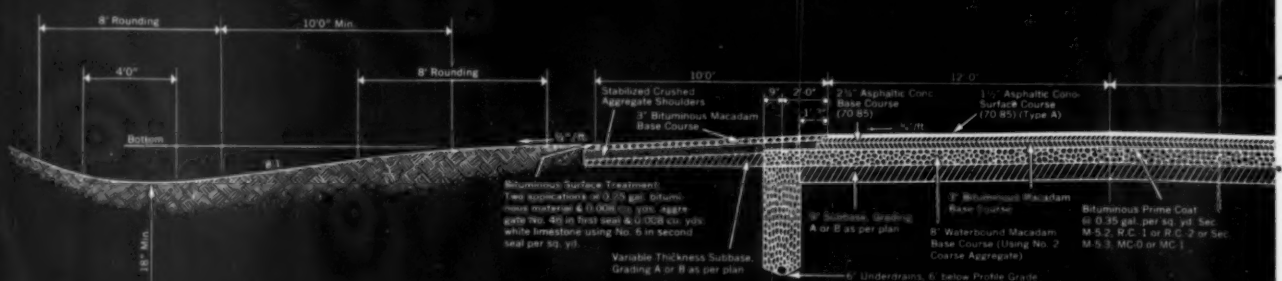


#### HERE IS DEEP STRENGTH DESIGN ON OHIO INTERSTATE 71



- A.** 1½-inch Asphalt concrete surface course
- B.** 2¼-inch Asphalt concrete base course
- C.** 3-inch penetration Asphalt macadam base course
- D.** 2–4-inch water-bound macadam base courses
- E.** 9-inch selected gravel subbase

For strength and durability, 7¼ inches of Asphalt surface and base are laid on 17 inches of compacted aggregate.





## New Section of Interstate 71:

# First DEEP STRENGTH Asphalt Paved Interstate Highway in Ohio!

Traffic is now rolling on the first DEEP STRENGTH Asphalt paved Interstate Highway in Ohio. Serving a highly industrialized area, this new 17-mile section of Interstate 71 will be subjected to heavy freight traffic.

That's one reason why Ohio State highway engineers chose DEEP STRENGTH Asphalt pavement. Notice in the cross-section drawing (below) how design follows precepts of DEEP STRENGTH Asphalt construction . . . heavy-duty Asphalt concrete surface course . . . heavy-duty Asphalt base . . . Asphalt primed subbase . . . **depressed median and deep longitudinal drain on outside and inside shoulders for good drainage** . . . heavy proof-rolling of subbase . . . and use of high-contact pressure pneumatic proof-roller on all other courses. **HERE IS STRENGTH AND DURABILITY!**

**When built like this—for DEEP STRENGTH—Asphalt pavements will carry heaviest traffic loads without distress . . . and with minimum maintenance cost.**

And, most important, Asphalt pavements built to this Advanced Design Criteria can often save money over the cost of Asphalt pavement designed to other standards. That's because the Advanced Design Criteria permit inexpensive Asphalt base to be substituted, within limits, for more expensive Asphalt concrete surfacing, and allow reduction in total structure thickness when used in place of untreated base.

**NEW HANDBOOK!** A new edition of the *Asphalt Handbook* incorporating all the Advanced Design Criteria implied by the term DEEP STRENGTH Asphalt pavement is now available. Write to The Asphalt Institute.



New DEEP STRENGTH Asphalt section extends northeast paralleling existing U. S. Route No. 42.



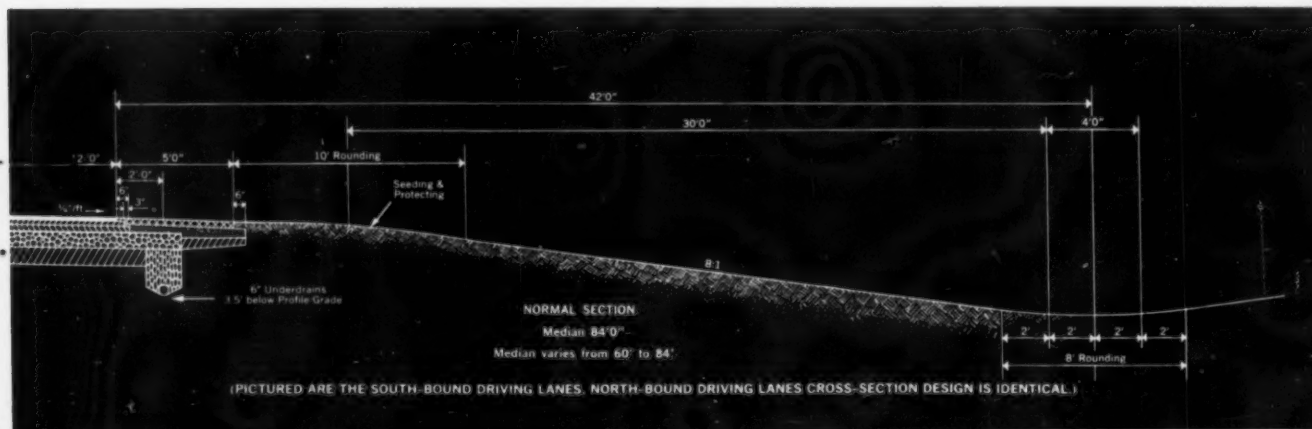
**For smoother riding,** the subbase was proof-rolled with a 50-ton compactor using tire pressures of 150 psi. A 30-ton rubber-tire compactor with tire pressures of 120 psi was used on all other courses.



**For good drainage,** section was designed with a depressed median and a system of deep longitudinal drains on each side of travel lanes to prevent water from entering the foundation courses.

## THE ASPHALT INSTITUTE

Asphalt Institute Building, College Park, Maryland



LINK-BELT SPEEDER  $\frac{3}{4}$ -yd. LS-78 with optional tractor lower...

## ***Pilot model passes 800-mile torture test with flying colors***

The Link-Belt Speeder LS-78's tractor-track furnished ground-hugging traction no matter where the pilot model traveled — in the mud and muck of the Link-Belt Speeder proving grounds, the abrasive sands of the great Southwest, the punishing rock of the Big Bend region of the Rio Grande, and the hill country of southern Indiana.

During the one-year period the tracks were adjusted only *twice*. And this took the operator about five minutes per track belt, thanks to the exclusive hydro-piston adjustment with a grease gun. Compare this with a delay of up to three

or four hours on some rigs that have only an adjusting bolt and nut arrangement.

Not once did the LS-78 walk out of its tracks! The reliable track compensating unit freed the track belt of branches, stones and other objects in its 800-mile journey. Snags and pesky obstructions proved no stopper either. The 22-inch high-clearance lower skimmed over them.

For further details on the exclusive LS-78 drag-clam-hoe with a *proven talent for travel*, see your local distributor. Or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

109-61N

### ***Normally high-wear track components***



Track drive wheels



Track rails



After one year of testing (800 miles of travel), the LS-78 pilot model was returned to the factory for complete teardown and testing for wear. Four of the normally high-wear components were steam-cleaned and photographed beside new components in the series of pictures above. So negligible was the wear that if it were not for a fresh coat of paint on the new components, it would be difficult to distinguish between the two in each case.



*show little effect of travel abuse*



Track idler wheels



Track rollers

## LINK-BELT SPEEDER



21 crawlers

6 truck cranes

4 self-propelled

***It's time to compare . . . with Link-Belt Speeder***

...for more details circle 307 on enclosed return postal card

**ROADS AND STREETS, May, 1961**

# New Publications

## Unpaved Road Maintenance

The Importance of Timely Spring Maintenance. This brochure describes procedures for spring conditioning of unpaved roads and streets, particularly how to improve loose gravel surfaces. It contains two application charts, for easily estimating total calcium chloride for various rates of application and road widths. Available free on request to the Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

## Soil-Cement Development

Soil Stabilization by Admixing Portland Cement. Bulletin 267. Highway Research Board, 2101 Constitution Avenue, Washington 25, D. C. Price: \$1.20.

Contains four papers covering re-

spectively (1) A rapid field method for determining cement content of plastic cement-treated base; (2) Cement requirements of selected soil series in Iowa; (3) Comparisons of type I and type III portland cements for soil stabilization; and (4) Development of a test for identifying poorly reacting sandy soils encountered in soil-cement construction.

**TIRE GUIDE.** Published annually. Elgar Company, 2 East Twenty-Third Street, New York. \$2.00 per copy. Pocket-size booklet, 80-pages, containing statistics on tire sizes and specifications for all makes of passenger cars, trucks, off-road and agricultural equipment.

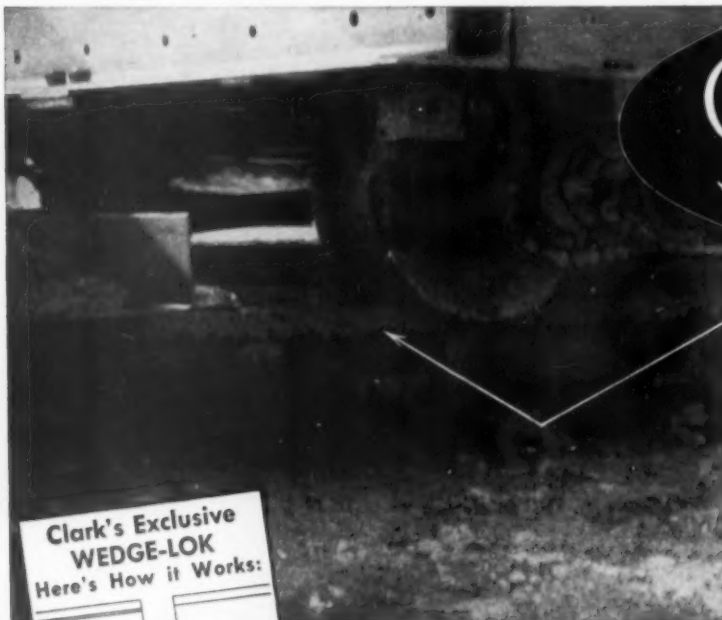
**1960 REGISTRY OF PUBLIC SAFETY RADIO SYSTEMS.** Edited by Ethel V. Sleeper. 192 pages, 8½ x 11. Com-

munication Engineering Book Co., Radio Hill, Monterey, Mass. \$4.00 postpaid.

Listings in this 15th edition portray the rapid expansion of mobile radio use in the public safety services. Completely revised from FCC records at Washington, this Registry covers all mobile, fixed and relay transmitters operated by municipal, county, state, zone, and interzone police, fire departments, local government, forestry conservation, special emergency and highway maintenance organizations.

**DRIVER REQUIREMENTS IN FREEWAY ENTRANCE RAMP DESIGN.** By Charles Pinell. Reprint No. 12, Texas Transportation Institute, College Station, Texas. Consists of a reprint of an article published in Traffic Engineering, December, 1960.

*Continued on page 32*



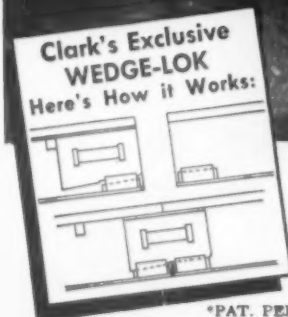
**CLARK  
WEDGE-LOK**  
PAVING FORMS

**No deflection  
at the joint  
during load transfer**



**NOW! form setting time  
reduced** to a minimum with  
Clark Wedge-Lok\* the exclu-  
sive method of form joint.

See your local dealer for the  
complete Clark line of con-  
struction equipment.



\*PAT. PEND.

UNRETouched PHOTO

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DIVISION OF CLARK GRAVE VAULT CO.

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*How the*

## **BAY CITY 72**

*Will Help You*

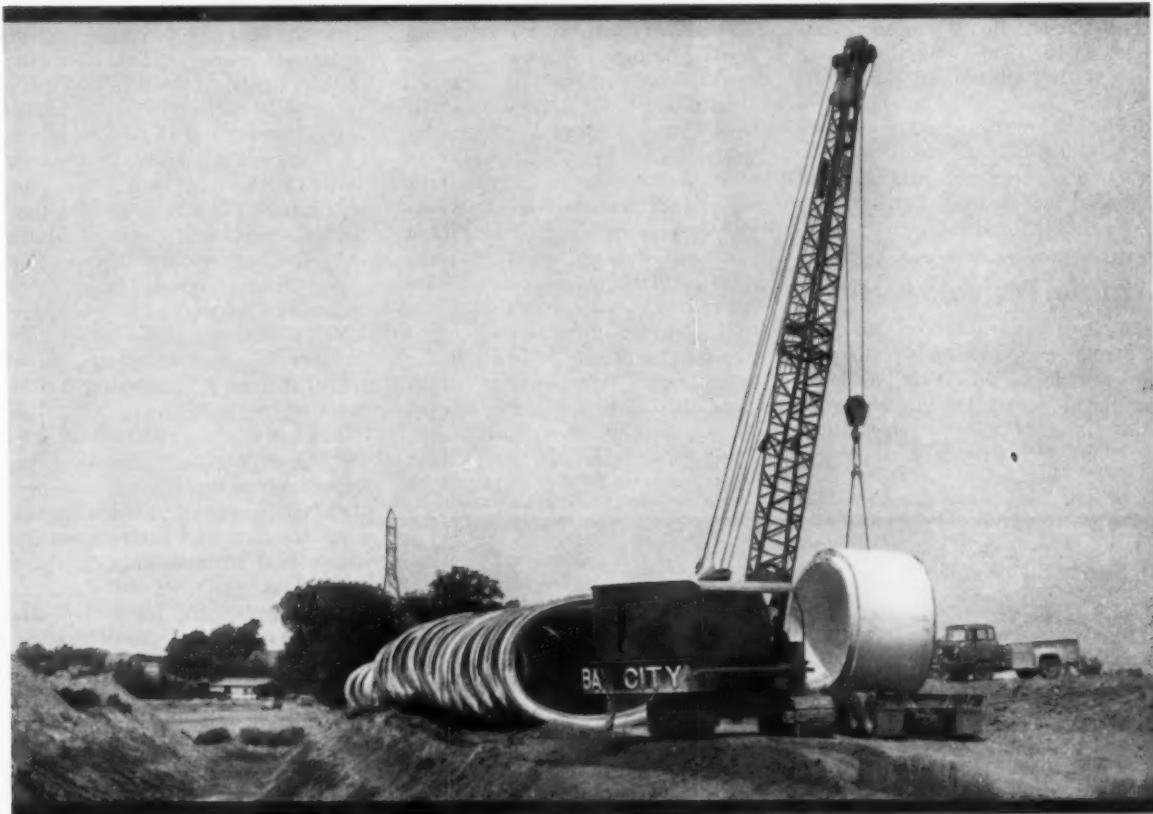
*Close the*

**"PROFIT GAP"**

What's the true measure of a profit-producing crane-excavator? On-the-job ability and on-the-job dependability. You get both, in the highest degree, in a BAY CITY Model 72. This 1½-yd. excavator with 30-ton Crane capacity offers you a combination of proved advantages that can well make the difference between break-even and profit.

- **SMOOTH, BALANCED POWER** is provided through a fluid coupling and an enclosed speed reducing unit consisting of helical gears splined to shafts mounted on ball bearings. Running constantly in a bath of lubricant, this assembly gives longer life . . . eliminates adjustments required with a chain drive.

- **POWER CONTROLLED BOOSTERS** set main clutches with minimum hand lever pull. While easy to adjust, these clutches actually require less maintenance attention — there are no delicate mechanisms such as compressors, pumps, valves or tubing lines to cause trouble and slow down operations.



Here's a Model 72 in action during relocation of U. S. Hwy. 12 near Benton Harbor, Mich. The machine is working on a large drain section over which an overpass is to be built. Each 13-ft. dia. drain pipe weighs 22 tons.

- **CAST STEEL BASES** for lower works and revolving frame resist deflection . . . withstand shock loading . . . assure longer service with minimum maintenance. Roller and ball bearing mounting of all drums and shafts assures maximum transmission of power.

- **ALSO AVAILABLE AS ERECTION CRANE** with a fully independent boom hoist, power operated for both raising and lowering, an automatically set boom brake, a power load lowering device, a collapsible hi-gantry, pendant cable suspension, telescopic boom stops and pin-connected boom sections. This combination of features results in faster, safer load lifting and spotting . . . quicker, easier setups.

If you are planning on new equipment, there are many other Model 72 advantages you should know about. Have your BAY CITY dealer tell you what they are. Remember — there is a difference between promising bigger profit margins and actually delivering them!

# **BAY CITY**

**SHOVELS, INC.**  
2611-C Center Ave.  
BAY CITY, MICHIGAN

*a subsidiary of Unit Crane & Shovel Corp.*

... for more details circle 282 on enclosed return postal card

# New Publications

Continued from page 30

**HIGHWAY RESEARCH PROCEEDINGS**, 39th Annual Meeting (January, 1960). Highway Research Board, 2101 Constitution Avenue, Washington D.C.

This 728-page cloth bound volume was sent to members of the Board recently. It contains about 40 papers among the many presented at the Board's meeting January 11-16, 1960 along with a listing of the voluminous publishing in other forms issued by the Board during the 1960 calendar year.

Non-members of the Board interested in these proceedings should address the Board's headquarters (see above) for details.

## Airfield Paving Selection

A DOCUMENTED REPORT covering the relative merits of asphalt and concrete pavements at civil airfields has been issued by the National Bituminous Concrete association. The purpose is to assist city engi-

neers and officials in selecting pavement for aircraft.

The 134-page report, "Selection of Pavement Types for Civil Airfields," is co-authored by NBCA's Research Coordinator C. R. Foster and Executive Director H. K. Griffith. It shows that:

(1) Jet fuel resistant pavement should be provided for refueling, parking and service areas.

(2) Blast resistant pavement should be provided at ends of runways to accommodate possible usage by Air Force and Navy jets.

(3) In remaining areas (taxiways and interior of runways), either conventional asphalt or portland cement concrete pavements will be satisfactory; neither shows any comparative superiority from the standpoint of safety, strength, maintenance costs, or life expectancy. Pavement in these areas, therefore, should be selected on the basis of lowest initial cost.

(4) Since estimates cannot take

into consideration all aspects of competition, alternate bids for both asphalt and concrete pavement are recommended for taxiways and runway interiors when the estimated cost differential is within 15 percent.

In recommending that the selection of pavement for taxiways and runway interiors be made on the basis of lowest initial cost, the NBCA paper alludes to a cost study of some 36 million sq. yd. of heavy-duty concrete and 16 million sq. yd. of heavy-duty asphalt pavement built for the Air Force in the past six years. The study showed that asphalt pavement averaged about half the first cost of the concrete pavement of comparable load carrying capacity. At current prices, the average differential to initial cost between the two competing pavements is from \$250,000 to \$750,000 for a typical airfield.

Regarding the controversial subjects of maintenance costs and life expectancy of both pavement types, the NBCA paper states that all available data and information indicate near equal ratings on these two points.

In any planning for a civil airfield, the report urges consideration of the chance that future aircraft may require increasing the load carrying capacity or extending the runways. Pavement construction should be based on estimated conditions for the next 20 years, with provision for increasing the load carrying capacity later if need be.

A copy of this report may be secured by writing the National Bituminous Concrete Association, 1145 19th St., N.W., Washington 6, D.C.

**HIGHWAY PROGRESS**, 1960 Annual report of the Bureau of Public Roads. Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price 35 cents. 108-page bulletin contains a wealth of statistical data on aspects of the federal aid highway planning, financing, design, construction, bridges, maintenance, traffic and operation and research.



Portabilize with a Childers' ALL-IN-ONE trailer mounted dual storage tank. Insulated Dryer Fuel Oil Tank and Asphalt Storage Tank, with your choice of capacities 4,000 to 25,000 gallons, are independently coiled and controlled. Heater, sized to tank capacities, mounted on gooseneck, and pumps mounted on rear platform. These units save YOU time, labor and money.

Economize with Childers' new Little Devil. This manually operated, insulated, unit has been engineered to provide a high quality heater, at a low cost, for Hot Mix Plants with capacities of 10 to 40 TPH. Fuel input, at Your control, is 2 to 6 GPH, and horsepower required is 1-3/4. There is no factory installation service assistance required.

Contact your local distributor or Childers direct for details.

## CHILDERS MANUFACTURING COMPANY, INC.

• FACTORY AND MAIN PLANT  
P. O. BOX 6185 - STATION B  
ALBUQUERQUE, NEW MEXICO

• EASTERN DIVISION  
P. O. BOX 4587  
RICHMOND 29, VIRGINIA

... for more details circle 286 on enclosed return postal card



Only eight hours transmission downtime per unit in approximately 2700 hours of operation over a period of 2½ years averages out to

## 99.71% AVAILABILITY!

A. F. Keyes Co., Inc., South Milwaukee, Wisconsin, is using Fuller 5-G-1520 5-speed Transmissions in four Le Tourneau-Westinghouse Scrapers on construction projects in southwestern Wisconsin. None of the four units has had more than eight hours of transmission downtime—and each has logged more than 2700 hours of operation.

Two of Keyes' L-Ws are Model B

Full Packs, and two are Model B BM-2s. The constant-mesh, spur-gear Fuller 5-G-1520s feature, as standard equipment, the Fuller air-actuated countershaft brake, which permits quick, easy up-shifts without double clutching. Also standard on the 5-G-1520 is the Fuller pressure lubrication and filtration system, which keeps gear oil clean, provides longer gear and bearing life and increases avail-

ability for your operation.

Bernard Schuh, Chief Mechanic for Keyes, says, "We're extremely pleased with both the performance and reliability of the Fuller 5-G-1520 Transmission. If you buy a good piece of equipment and take care of it, it's going to perform profitably for you. And that's certainly the case with the Fuller Transmissions in our LeTourneau-Westinghouse Scrapers.

**FULLER** TRANSMISSION DIVISION  
**EATON MANUFACTURING COMPANY**  
 KALAMAZOO, MICHIGAN

Sales & Service: West. Dist. Branch, Oakland 6, Cal. • Southwest Dist. Office, Tulsa 3, Okla. • Automotive Products Co., Ltd., Brock House, Langham St., London W.1, England, European Rep.

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ROADS AND STREETS, May, 1961



*Rugged corrugated Beth-Cu-Loy pipe can easily withstand this kind of treatment. With smaller diameters, Beth-Cu-Loy sections can often be man-handled.*

## **STEEL IS IDEAL FOR FAST WORK**

Drainage pipe made of Beth-Cu-Loy galvanized sheets has the strength, ruggedness, light weight, and flexibility of *steel*. Steel can take rough handling. Steel can flex to meet variations in grade and alignment. Steel can take traffic impact and vibration, and the shifting actions of soil in changing weather.

# **No need to baby it when it's fabricated from Beth-Cu-Loy corrugated galvanized steel sheets**

You don't have to be gentle with long lengths of Beth-Cu-Loy drainage pipe when you lay them in the trench. And you don't have to worry about curing and setting time when making field joints. Your trench doesn't have to be a featherbed, nor will you have a problem with grade and alignment.



*Standard connecting bands speed up job of field-joining long lengths of Beth-Cu-Loy drainage structures.*





## **FIELD JOINTS QUICKLY MADE**

With a Beth-Cu-Loy drainage pipe or culvert, field joints are quick and easy. You just slip a standard connecting band over the end of one pipe section, move the next section into place, then draw up the bolts on the collar of the band. Corrugations of the band nest perfectly with those of the pipe sections.

Bethlehem manufactures the Beth-Cu-Loy culvert sheets to meet the rigid specs of the AASHO. Your fabricator will be glad to give you full details on pipe made of Beth-Cu-Loy. If you wish, we will send you the name of a fabricator near you. Just drop us a line.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

*Export Sales: Bethlehem Steel Export Corporation*

# **BETHLEHEM STEEL**

... for more details circle 279 on enclosed return postal card



*For  
Strength  
Economy  
Versatility*



## Huge Pike Contract Held Up By Financing

The unprecedented \$91,883,000 contract negotiated for the 12-mile leg of the Massachusetts Turnpike into Boston is still on the books. But the project was at a standstill late in April due to inability of the turnpike authority to complete the board financing.

As announced earlier by William F. Callahan, authority chairman, the combine of Perini Corp., Framingham, Mass.; Morrison-Knudsen Co., Inc., Idaho; and Kaiser Co., California, has been selected to do the work. The firms have a net combined worth of more than \$250 million.

The contract was negotiated rather than put out for competitive bidding because of the need for speeding construction of the spur. Callahan reports that for every day saved in construction there will be a per diem saving of \$24,000 in interest charges. The safety and convenience of the public are also factors in the decision for all-out

speed, since the new facility will reduce congestion on area streets and highways and provide an express highway with Boston from the west.

A statement previously issued by F. S. Mosely & Co., managers of a banking syndicate handling a \$175 million bond issue to finance the project, said it concurred with the "method of procedure" because "it is our judgment that the experience, unlimited equipment and financial resources of these eminently qualified construction firms would give prospective buyers of the bonds added confidence in the completion of the project within the time specified." The authority pointed out that a six-month delay in the opening of the major part of the turnpike would cause extra interest charges and losses in anticipated revenue.

Under terms of the contract, Callahan said, the contractors would be liable to a penalty of \$5,000 a day in any lag behind on-time completion.

## Radio Control Enlarged for Parkway Operation

The New Jersey Turnpike Authority has contracted for improvements and enlargements of its radio communications system.

One contract for \$285,995 went to Motorola Corporation, covering the radio system for the maintenance department and for remote control of warning signs. The other for \$188,507 was given to RCA for microwave improvements to accommodate a second mobile radio system for the maintenance department, and to install additional radio telephones.

## Iowa Uses Consultants

The Iowa state highway commission has completed negotiations with six consulting engineering firms in Iowa to produce construction plans for projects in the commission's 1962 construction program. The primary announced reason for this move was to assure that work on certain projects will be speeded up and kept on schedule.



# STRENGTH

With offices networking the nation and assets of over half a billion dollars, The Fund can assure that bulwark of security so necessary for your construction operations. The Fund's policies are geared to meet all your insurance needs, including Contract Bonds, Workmen's Compensation, Public Liability, Crime and Builder's Risk coverages. By servicing the total account, The Fund can often save you money, lower your bid and help you acquire new jobs. Ask your insurance agent or broker to insure you through The Fund of Experience.

CENTRAL BONDING OFFICES:  
3333 CALIFORNIA STREET, SAN FRANCISCO  
110 WILLIAM STREET, NEW YORK  
Branch Offices in Principal Cities in America



...for more details circle 313 on enclosed return postal card



York Drilling Co., Inc. drills

# 100,000 ft of 5" hole in 5 months

to provide crushed stone for Dulles International Airport

Four and at times five Ingersoll-Rand Drillmasters of the famous York Company have been drilling around the clock for the past 5 months putting down more than 100,000 feet of 5" hole in hard semi-granite diabase rock. Working at the quarry of the Chantilly Crushed Stone Co., Chantilly, Virginia, these completely self-contained drilling rigs have been drilling rock for the new jet-age Dulles International Airport.

These Drillmasters are part of a large fleet that has drilled 2,000,000 feet, or over 380 miles of 5", 6" and 6½" hole since 1953 in York's extensive quarrying and water-well operations. These same units drilled 449,636 feet of hole in 1959.

John W. Crerand, Vice President and General Manager of York Drilling Co., Inc., says that the Ingersoll-Rand Drillmaster is the best all-around blast-hole machine for contract drillers.

If you want to cut your blast-hole drilling costs, be sure to get the Drillmaster story. Ask your Ingersoll-Rand sales engineer for complete information.



Six of the York Drilling Company's Drillmasters — part of a fast-growing, fast-drilling fleet that has put down more than two million feet of hole since 1953, in both quarrying and water well work.

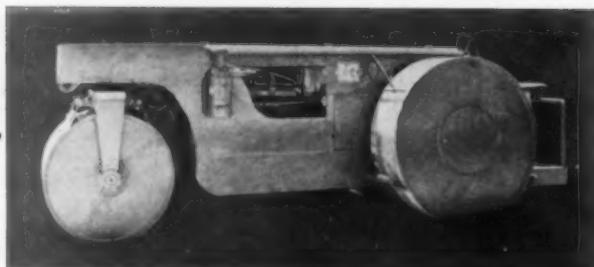
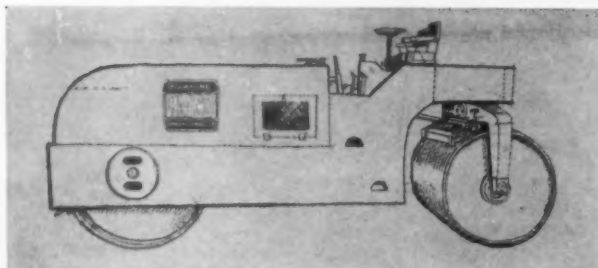
**Ingersoll-Rand**  
179AS 11 Broadway, New York 4, N.Y.



A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK

... for more details circle 324 on enclosed return postal card

## GIVE YOURSELF THE ADVANTAGE OF THE RIGHT COMPACTION EQUIPMENT



BMCO steel wheel rollers are deliberately designed for ease of operation and rugged dependability. Outstanding features include:

- Automotive type power steering
- Simple, well-grouped controls and instruments
- Torque converter
- Revers-O-Matic drive with 4 speeds forward, 4 reverse
- Anti-friction bearings throughout

The extremely low silhouette of the three-wheel rollers gives the operator maximum visibility, and the extra large platform is equipped with a safety guard rail. Tandems feature over-sized water tanks with large filler plugs; large plates on both drums to permit loading ballast with a hand shovel; minimum of overhang to reduce hand finishing near walls; and removable rear cowlings for ease of routine servicing.



**BROWNING MANUFACTURING CO.**  
P. O. BOX 2707 - SAN ANTONIO, TEXAS - WALnut 3-4331  
Export Office: P. O. Box 1051, Denver, Colorado

### BROWNING MANUFACTURING CO.

P. O. BOX 2707, SAN ANTONIO 6, TEXAS

Please send me complete information on the following BMCO Rollers: ☐ Vibrating

☐ Pneumatic Tired, Self-propelled ☐ Tow Type ☐ Steel Wheel (3-Wheel, Tandems)

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

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## Maintenance

### Ice Melting Mixture Gaining in Use

Last winter motorists often wondered how the streets and roads got cleared of ice so fast after storms. The reason often was the growing use of a mixture of rock salt and calcium chloride.

Each chemical has been applied separately in past years to melt ice. But mixing the two, according to the Calcium Chloride Institute, produces a potent formula which turns hard packed ice into slush in minutes, even at low temperatures. Slush is cleared off, and pavement is soon dry and safe for travel.

The mixture has been thoroughly tested on three major toll roads and in state highway departments. Every test has proved that the mixture melts ice faster and at lower cost, according to the Institute. Kansas, Pennsylvania, Ohio, Wisconsin, Michigan, Illinois, Maryland and Virginia are among the states reported to have continued their use of the mixture during the 1961-1962 winter.

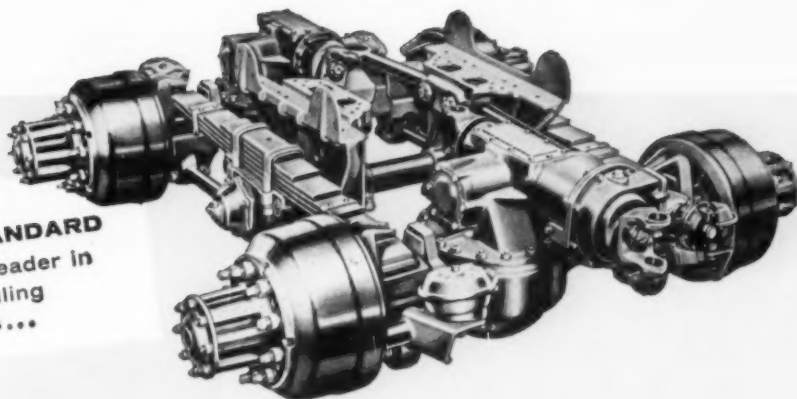
THE SALTING PROGRAM on the Iowa state highway system was expanded to include 3,750 miles of primary highways during the 1960-1961 winter. This covers 452 miles not salted the previous winter, or a third of all primary roads "when conditions warrant."

State maintenance crews, working in conjunction with plowing, apply 200 to 500 lb. of salt per mile. Sand or cinders were to be used on hills and curves when the temperature falls below the minimum for salting.

THE OKLAHOMA STATE HIGHWAY department has put eight newly purchased push-button striping machines into action this spring for marking more than 10,000 miles of highways. The machines are capable of painting three reflectorized bead operations simultaneously: a center line either broken or unbroken, a no passing zone and a road edge line.



**ROCKWELL-STANDARD**  
Acknowledged Leader in  
Rugged Hauling  
Operations...



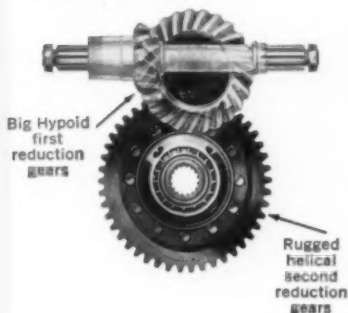
## Here's why Timken-Detroit® DOUBLE-REDUCTION TANDEMS LEAD IN TOP PERFORMANCE—LONG LIFE!

Timken-Detroit Heavy-Duty Tandems with Hypoid Helical Double-Reduction Gears are the big favorites for top performance and long life.

Here are some of the reasons why:

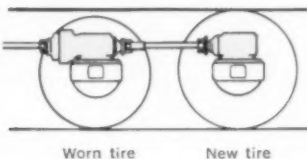
### Rugged Hypoid-Helical Double-Reduction Gearing!

Balanced gearing—with two full-sized gear sets working in series to take an equal share of the load—provides a stronger power train with balanced gear set loadings and the widest range of ratios.



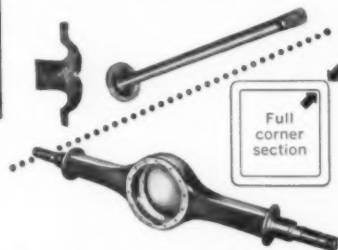
### Driver Controlled Interaxle Differential!

Allows differential action between the axles to compensate for worn or mismatched tires. Both axles do equal amounts of work... can be disengaged at any speed, giving positive through drive when better traction is needed. *Straight-Line Through Drive* eliminates prop shaft angularity... increases bearing and gear life, reduces maintenance.



### "Torsion-Flow" Axle Shafts and Hot-Forged Housings!

More splines, Torsion-Flow forging, and patented heat-treating processes make Rockwell-Standard shafts the toughest in the industry. Housings are hot-forged from high carbon steel, and are rectangular shaped with full strength corners for greatest strength with minimum weight.



Timken-Detroit Double-Reduction Tandems come in a wide range of capacities—6 models from 34,000 to 65,000 pounds.

*Another Product of...*

**ROCKWELL-STANDARD**  
CORPORATION



Transmission and Axle Division, Detroit 32, Michigan

...for more details circle 332 on enclosed return postal card

*Another FIRST from Esso Research...*

# ANNOUNCING TWO NEW COLORED PAVING MATERIALS

*Viadon\**

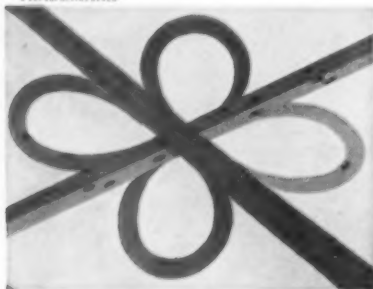
for permanently colored pavements that  
open up new horizons in design!



*Miradon\**

for colored pavements requiring high  
resistance to fuels and oils!

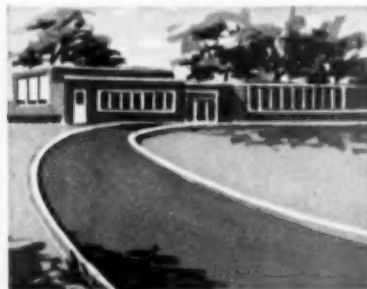
\*TRADEMARK



**PROMOTES HIGHWAY SAFETY:** Can be used to set off speed zones, stop streets, crosswalks, safety islands, and turn-offs at cloverleaves.



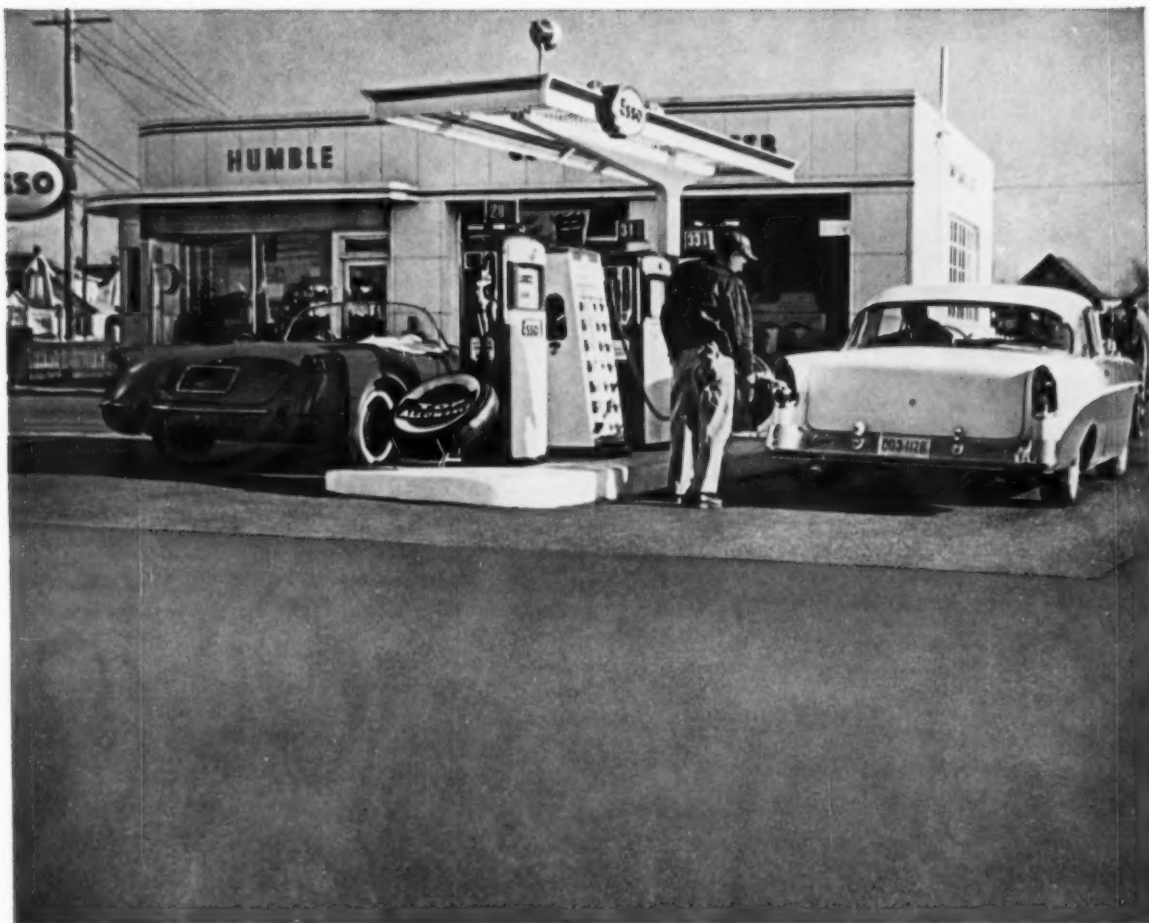
**INCREASES PLANT EFFICIENCY:** Makes light-colored, high-strength flooring; distinguishes danger zones, exits, assembly areas, etc.



**DECORATIVE:** The modern trend to color creates a ready-made demand for driveways, carports, and patios paved in color.

Today, color is everywhere — serving all kinds of decorative and functional purposes. Why not on pavement, too... permanent color mixed into the pavement to stay in as long as the pavement lasts? Esso Research now announces the answers: VIADON and MIRADON! These remarkable new materials make colored pavement a practical reality. The color is built in. It

cannot wear off. Either material can be mixed in a standard asphalt pugmill and both can be laid with existing construction equipment. Resulting surfaces are able to support heavy traffic on roads or runways. Applications are almost limitless! Shopping centers, parking lots, driveways, playgrounds, tennis courts, patios, and pools can now be surfaced in pleasing



**NOW! COLORED PAVING IN RED, GREEN, BLUE, YELLOW-GOLD AND WHITE!**



**STAYS WHITE WHEN WET:** High-strength extruded curbing of Viadon or Miradon won't turn gray in rain like other materials.



**IDEAL FOR AIRPORTS:** Unaffected by fuels and lubricants, Miradon colorfully identifies landing strips, aprons, and parking areas.



**THERMOPLASTIC:** Won't set permanently in transit; can be softened by heat if desired. No special storage facilities are needed.

colors to harmonize with their surroundings. For greater traffic safety, curbs, crosswalks, intersections, centerlines, etc., can be clearly and permanently

indicated with Viadon or Miradon. For more information or technical assistance, write to us at 15 West 51st Street, New York 19, New York.

**ESSO STANDARD, DIVISION OF  
HUMBLE OIL & REFINING COMPANY**



WESTERN UNION  
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WU7 PD TORRINGTON CONN NOV 23 1259P EST

BUFFALO-SPRINGFIELD CO

SPRINGFIELD OHIO

PICKED YOUR 3 AXLE VIBRATORY ROLLER FOR VERMONT INTERSTATE  
89 CONTRACT AFTER SEEING IT IN ACTION ON ANOTHER JOB. WAS  
FASTEST METHOD I HAD EVER SEEN FOR COMPACTING BASE COURSE.  
AFTER USING IT NOW KNOW IT'S FINEST VIBRATORY ROLLER ON MARKET

CHARLES L ROSSI, S V ROSSI CONSTRUCTION CO INC

TORRINGTON CONN

119P.

## *"Finest Vibratory Roller on the Market"*

says Charlie Rossi, S. V. Rossi Construction Co., Inc., Torrington, Conn.

Buffalo-Springfield KX-25EV 3-axle Vibratory Roller features exclusive "walking beam" compaction control. Center roll vibration from 1500 to 2200 vpm. Center roll can be raised hydraulically and machine used as two-axle tandem. Or you can use it as standard 3-axle tandem without vibration. See your Buffalo-Springfield distributor.



## **BUFFALO- SPRINGFIELD COMPANY**

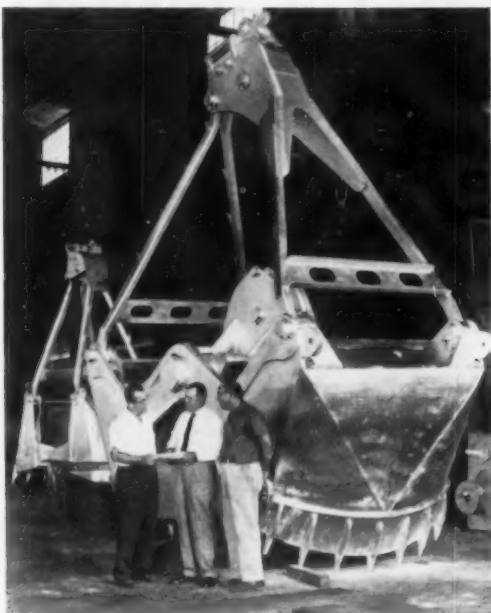
Springfield, Ohio

**K** A Division of  
**KOEHRING**  
Company

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## Big, Big Bucket



Largest clamshell bucket ever fabricated in Southern U.S.A., dwarfs its builder, Cliff Yaun (left), president of Yaun Manufacturing Co., Inc., its new owner, A. A. "Tex" Lindley (center), president of Mall, Inc., and its designer, C. L. Paxton (right), Yaun's plant superintendent. The bucket weighs 24,000 lb., can handle 18 cu. yd.

## 2-Way Radio to Aid Iowa Road Maintenance

The Iowa state highway commission has authorized installation of two-way radio on maintenance vehicles serving the Interstate highways in five Iowa counties, and the planning of a state-wide radio system for the highway department.

Installations in each county will include two or three fixed stations and 8 to 17 mobile units. A total of 12 permanent stations and 63 mobile units will be used. A radio consulting firm meantime is designing similar systems for the state's other 94 counties.

Maintenance crews under the new system can use two-way radio both in emergency and routine operations. Emergency uses include summoning aid to motorists stranded on the Interstate system, coordination of snow removal, and direction of crews to clear highways in case of accidents or road damage.

"In day-to-day work," notes a department spokesman, "radio will allow foremen better control of their men and equipment, thus permitting more efficient maintenance. Radio allows crews to maintain larger areas. This means a direct cost saving, as the state can absorb some of the growth in maintenance needs without expanding crews."

"Engineering studies and experience reported from other states show a saving that would ultimately more than pay the cost of radio facility," said this news release to the Iowa press.

ROADS AND STREETS, May, 1961

Will your present rollers be earning \$\$\$ for you in 1965?

... this one will!



INGRAM 8-12 TON TANDEM

INGRAM 12 TON 3-WHEEL

**FACT:** Compaction roller owners get more years of service with Ingram rollers.

**Reason:** Every detail of an Ingram is made and assembled by specialists to provide contractors with a better performing roller needing less maintenance.

Thirty years of design and engineering experience goes into every Ingram roller by men who know compaction problems. From yoke pins to power units, all parts in an Ingram are selected for their ability to provide longer top performance.

Required compaction densities are reached faster, at less cost... with an Ingram. 3-wheel, tandem or self-propelled pneumatic rollers... in sizes for any job.

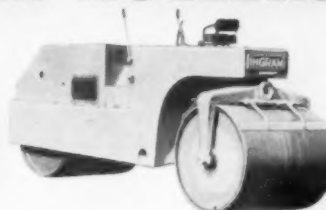
Call or visit your near-by Ingram distributor today. You'll see why an Ingram roller is your "best buy."

Write for free literature to: Acme Iron Works, P. O. Box 2020, San Antonio 6, Texas.

## INGRAM ROLLERS



Ingram 10-ton  
9-wheel pneumatic roller



Ingram 8-12 ton  
tandem roller

**Acme IRON WORKS**

P. O. BOX 2020 • SAN ANTONIO 6, TEXAS

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# *Faster, easier dozing...*



Faster dozing because you change speed range or direction with a flick of the wrist—no loss of power or momentum—no gear shift guesswork or clutching delay—save productive time on every cycle.

*Full-power shift . . . fast-as-a-fox maneuverability*

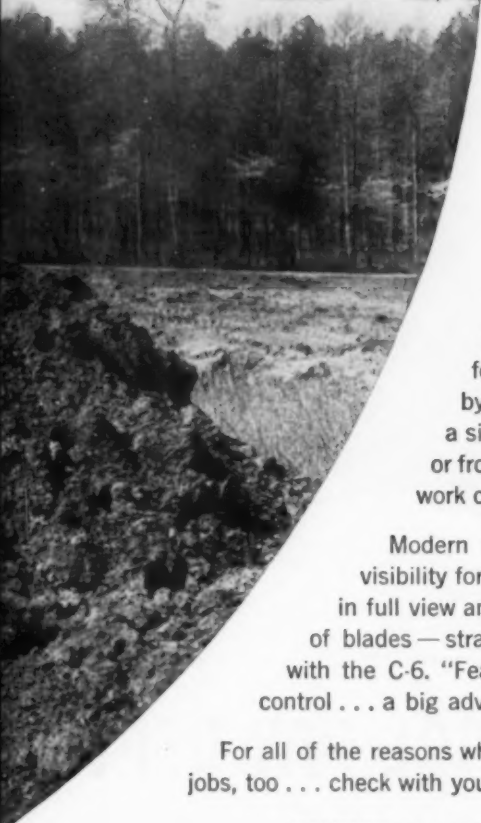


## **EUCLID**

FOR MOVING EARTH, ROCK, COAL AND ORE

# *...and overall work-ability*

## *put the "EUC" C-6 in a class by itself!*



No matter what your dozing requirements may be—from small grading work for land improvement, plant sites or secondary road construction to the big yardage projects—the new Model C-6 Euclid Crawler offers the best return on your equipment investment.

The C-6 has proved its ability to "doze circles" around other tractors in the 200 h.p. class on job after job. One of the reasons for this outstanding performance is the full-power shift provided by Torqmatic Drive. There's no time lost in clutching and shifting... a simple flick of the wrist changes from one speed range to another, or from forward to reverse and back again. You save seconds on every work cycle... keep power matched to the load and job conditions.

Modern design, with rear-mounted radiator, gives the operator better visibility for dozing. The blade is close to the front of the tractor where it is in full view and provides good balance and stability. There is a complete line of blades—straight, angle and "U"—engineered for top dozing performance with the C-6. "Feathered steering" results in smooth turning and positive track control... a big advantage on difficult slope work.

For all of the reasons why the C-6 has more work-ability on dozing... and other crawler jobs, too... check with your Euclid dealer for performance facts and figures.

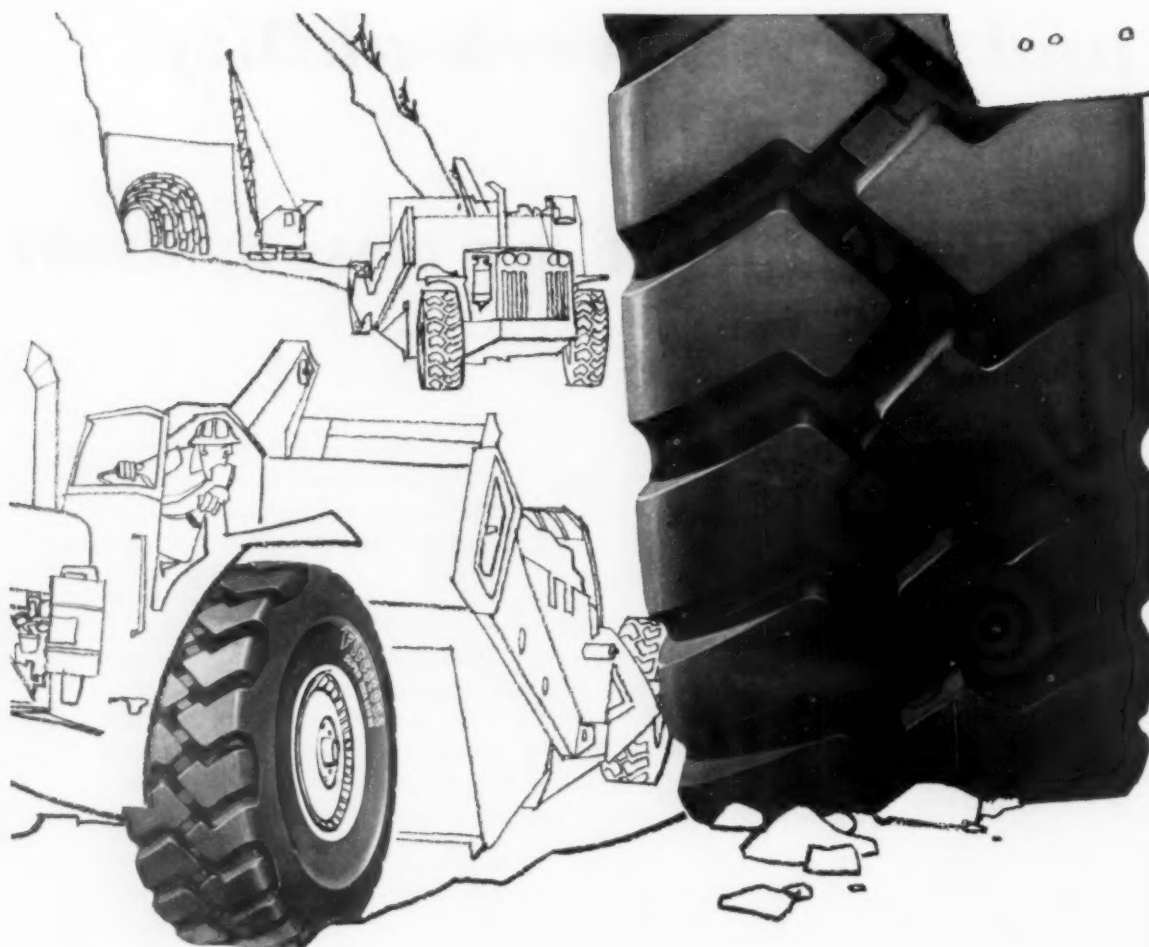
**EUCLID DIVISION OF GENERAL MOTORS • CLEVELAND 17, OHIO**

*Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland*



Good balance with heavy dozer attachments... rear-mounted radiator permits close mounting of straight, angle or "U" blade at front and provides excellent visibility for operator. Quick shift permits "rocking" the tractor to get under big boulders, stumps, etc. Power, speed and fast maneuverability, combined with a rugged undercarriage that stands up under heaviest service, make the C-6 a top performer.

**Torqmatic Drive...211 net h.p....easy service accessibility**



## Job records prove Firestone's **GIANT TIRES, GIANT SERVICE PAY OFF!**

1. Firestone Giant Tires pay off in terms of big savings with *extra* hours of use. That's why leading contractors depend on Firestone Super Rock Grip Wide Base\* tires. This tire and the complete line of Firestone off-the-highway tires are built with Firestone Rubber-X and Shock-Fortified Nylon cord bodies to last longer.
2. Firestone Giant Tire Service is your best insurance against profit-robbing tire downtime. Firestone Tire Specialists give you complete, 24-hour, on-the-job service for every tire you own to keep equipment *working*. They'll spot tire troubles before they can get started . . . and do your tire worrying for you!

Find out how Firestone's unbeatable 1-2 punch . . . Giant Tires and Giant Tire Service . . . will turn downtime losses into worktime profits. See your Firestone Dealer or Store or write to the Manager, Off-The-Highway Tires, The Firestone Tire & Rubber Company, Akron, Ohio.

Always Specify Firestone Tires When Ordering New Equipment.

\*Firestone T.M.

# Firestone

**FIRST IN OFF-THE-HIGHWAY TIRE NEEDS**

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Tune in Eyewitness to History every Friday evening, CBS Television Network

... for more details circle 309 on enclosed return postal card



## Labor

### Discharged Employees Win Rehire, Back Pay

Back pay for seven employees discharged by the Platte Valley Construction Co. after this road and fence building firm learned they had sought representation by the Operating Engineers Union, was recommended by a trial examiner for the National Labor Relations Board.

The firm was working on the Muddy Gap road project near Lander, Wyoming, February, 1960 when it learned that Operating Engineers Local 326 sought to represent its 46 employees.

The firm in polling its employees found that 24 signed a statement saying they had not requested union representation; 16 that they had; 6 did not sign. Claiming bad soil and weather conditions, the firm laid off seven pro-union employees (whom a spokesman for the firm said he would not rehire) and seven other employees.

Platte's employee poll violated the labor law, the trial examiner said. The Labor Board has that function. The examiner found that the firm discriminated illegally against the seven pro-union employees, because the firm: recalled only one of the seven for a two-week period; stated that it considered that they were not loyal employees; and said that it would not re-hire them.

The trial examiner recommended that the Labor Board order Platte to offer to re-hire the seven and pay them wages lost because of the discrimination. Whether to give the order is up to the Labor Board.

### 'Hot Cargo' Pact Excludes Road Work

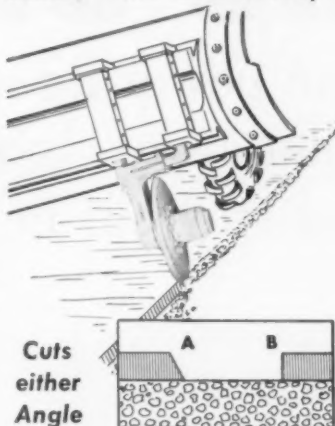
In the first agreement of its type since passage of the Kennedy-Landrum Act, some 200 members of the Grand Rapids (Mich.) Contractors Association agreed not to bid on projects unless all work is done by union contractors. However, they specifically excluded highway, bridge, and airport runway construction from the agreement. The agreement is with 21 unions in the Grand Rapids Building Trades Council.

## NEW from E. A. ROGERS!

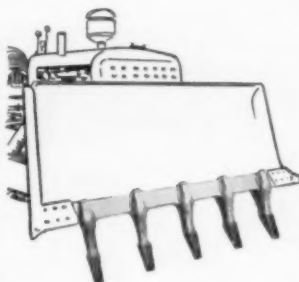
New Equipment Saves You Labor, Time and Money!

### NEW ROGERS Improved ASPHALT CUTTER

Cut asphalt at any angle or vertically! New bracket is easily mounted to rear of motor grader blade for angle cut; to scarifier block for vertical cuts. Leaves clean edge without fractures. Angle cuts make smooth joints for joining successive layers. For sewer trenching, asphalt road repairs, air strips, etc. Proved by years of trouble free service.



Cuts either Angle

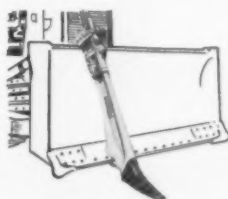
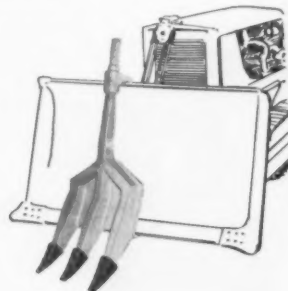


### NEW ROGERS Multi-Shank BRUSH ROOTER

Roots out brush, stumps out tree roots, easily cracks adobe or hardpan. Available in 5-, 6-, 7- shank units. Easily installed and removed from mold board of dozer blade. Penetration: 12" to 14". For use on tractors up to D-8 in size.

### NEW ROGERS Triple Shank CLEARING & STUMPING ROOTER

Heavy duty tool for rooting and stumping of brush and trees, raking rocks, etc. Can use 2 or 3 units on blade on big dozer. Easily clamps to top and bottom of blade. Penetration: 12" to 14".



### ROGERS RIPPER

Famous Rogers Ripper is a brute for ripping. Lifting and breaking rock, concrete, brush, frozen ground, etc. Penetrates up to 18". Exclusive design removes ripping strain from cutting edge. Warranted for 3 years. Use in multiples of 2, 3 or 4 if desired.

Write or phone today for information or FREE catalog.

# ROGERS



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This giant, diesel-powered "230" model can haul gross combination loads in excess of 100,000 lbs. Extra heavy-duty frame and front end.

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**INTERNATIONAL gets you in and gets you out—fast:** Higher average road speed of powerful, true-truck INTERNATIONAL V-8 engines cuts down trip time, picks up as many as *two extra 40-mile round trip hauls per day*. V-8's up to 257 hp; gas Sixes up to 212 hp; diesels with 695 lb.-ft. of torque and up to 262 hp.

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**INTERNATIONAL carries bigger loads:** These new lightweight IH bogies (up to 156 lb. lighter), plus heavy-duty springs and frames, give you bigger payloads, more savings in weight. Three new tandem axles now avail-

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Nothing could be more important to an operator working on a ton-mile rate than these proven built-for-work features. See the INTERNATIONAL Truck Dealer or Branch nearest you, for your next tough job. And remember this: INTERNATIONAL has a nation-wide network of sales and service centers to keep you operating. International Harvester Company, Chicago.

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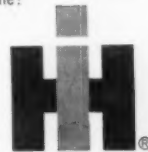
Sure traction underneath your payload. Powerful 6-cylinder INTERNATIONAL R-line models have GVW ratings up to 53,000 lbs.



Power-geared for a more profitable operation. There isn't a tougher, more dependable V-8 built for shortening round-trip time!

# TRUCKS

WORLD'S MOST  
COMPLETE LINE



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**ROADS AND STREETS, May, 1961**

THE CONTRACTORS, ROCKY MOUNTAIN PAVING COMPANY of Colorado Springs, laid this section with Texaco Asphaltic Concrete in "record time." Thus they prevented traffic delays, minimized inconvenience to motorists.



## Texaco Asphalt helps solve difficult drainage problem

This high, winding and scenic road stretches between Cedar Edge and Grand Mesa, Colorado. It's part of State Highway 65, a farm-to-market road that sweeps around the western slopes of the Rockies.

**To build a durable all-weather road**, the Rocky Mountain Paving Company first had to lick an important problem: poor drainage of the clayey subbase. To do this, they laid a substantial 4" base of crushed rock along the entire 10-mile stretch. Then they laid a 2½" pavement of hot-mix Texaco Asphaltic Concrete, using 120-150 penetration asphalt. This pavement was spread in two courses, a binder course and a wearing surface, each 1¼" thick.

**Low initial cost, low maintenance cost.** Colorado 65 is now resilient, free of bumpy expansion joints, and extremely smooth to ride. It's also durable—able to give years of service at a cost below that of maintaining a concrete road.

**Texaco Asphalt Cements and Liquid Asphaltic Materials** offer contractors a wide choice of materials for all kinds

of road building, airport runways and parking areas. If you'd like to know more about these asphaltic products, send for the two fact-filled booklets shown here: "Road Building with Texaco Asphalt" and "Plant Mixed Texaco Asphalt Pavements." Write: Texaco Inc., Asphalt Sales Division, P.O. Box 2332, Houston 1, Texas.



Chicago 4 • Denver 1 • Houston 1  
Jacksonville 1 • Minneapolis 3 • Richmond 25



# 'Highway Week' Needs Your Help

"National Highway Week," set for May 21-27, is planned to wake people up and make their desire for adequate roads felt in Washington. The campaign is a nation-wide one but the thing for us all to keep in mind is that it isn't really a national celebration at all. It breaks down into a *local* affair—right in your home state and community.

How big an impact will the Week have on your friends and neighbors? What mis-impressions will it help correct? What new awareness of the highway need will be kindled? What action generated from citizens?

Possibly *nothing* will happen, unless you step forth and offer your services. As a contractor, material supplier or equipment man, or an engineer or public official whose concern is the road or street program, you are uniquely familiar with the highway problem and the need for a continuing high level of planned road building. While the campaign is well in hand in most states, some states lack the leadership—unless you as a community leader will volunteer at this last minute.

In the states where the publicity is well organized National Highway Week is building up into a whirlwind, backed by the dynamic and imaginative work of the Better Highways Information Foundation out of Washington, D.C. The Foundation has compiled

and printed tons of informational matter. Through its help the state highway departments, good roads associations and civic clubs are set to dramatize the need for a strong continuing road program, in terms people can understand. Press tours, by road and air, are scheduled to help newspaper reporters and TV and radio people see the story for themselves.

The main thing is for you not to *assume* that something will be done in your state or community. We suggest that you pick up your phone and call your state highway department's public information office at the state capital, or call your contractor or trade association and ask how you can help.

A reminder is hardly needed that National Highway Week comes at a critical time. Many state legislatures are in session, and in most states should act on pressing highway legislation. The big concern however is our national Congress. Most members of both houses are in favor of a high level of highway construction. What it will take to *assure* the necessary new financing during this session is a lot of front-page publicity and favorable mail from back home. National Highway Week's long-range purpose is to leave the public better informed. Its short-range purpose is to generate those telegrams and letters to Washington.

That phone call to offer your help—how about it?

**Harold J. McKeever**



Hardtacing the teeth of a Caterpillar Traxcavator in the fleet of Friedrich, Loots & Below, Inc. Armored teeth of proper configuration help today's large-capacity tractor-shovels handle loading of highly abrasive and tightly embedded materials with top production.



A Cedarapids aggregate plant being checked over in the contractor's yard, where it is awaiting various sprucing up including roll and jaw refacing.

## 'All-Out' Hardfacing Keeps Aggregate Contractor Going

You can operate a crusher for up to six months in southern Wisconsin without need for building up crushing surfaces; but in most of the northern part of the state a set of rolls can lose up to  $\frac{1}{8}$  in. in a day.

A well-tried and "often sadder but wiser" witness to this fact is Friedrich, Loots & Below, Inc., of Oshkosh, a contracting firm specializing in sand, gravel and crushed stone production. Ralph Loots, vice president, can tell some chilling stories of the depredations made by that northern Wisconsin granite.

And he also points out the careful maintenance—shop and field—that the company's rock equipment receives to counter these conditions.

More than 40 years in business, the Friedrich, Loots and Below firm operates 24 trucks and the normal complement of construction equipment. It supplies material for road base construction. Although the company contracts for work of this type, its principal revenue is from aggregate production and sale to other road contractors, ready-mix firms, cities, townships and counties. The company owns its own pits and quarries, leases others.

South of a line running from Green Bay west through the state, quarry contractors work in limestone, and get considerable service out of equipment before surface buildup is required. North of this line the prevailing material is granite, and the story is different. Nightly welding in the field is necessary to replace losses of crusher roll steel. These losses run to a measurable fraction of  $\frac{1}{8}$ -inch in a day—and at the end of the week another  $\frac{1}{4}$  in. must be added to compensate for loss of metal caused by "dishing," a concave wearing away of crusher rolls toward the center. Crusher jaws are reversed weekly, with an extra set always kept handy as a spare.

The effects of working in the abrasive granite ma-

terial are "all bad," according to company principal Ralph Loots. The rock is so hard that one stone will not crush another; each one must be reduced against the manganese roll, thus slowing down the crushing and subjecting this unit to proportionately greater wear. Company maintenance crews have used up to 35 lb. of welding rod in a single night on jobs like this, Loots said. This field hardfacing work is tough on the men during cold late-fall nights in northern Wisconsin.

Since welding is such an important part of its maintenance program, Friedrich, Loots & Below has followed some definite policies in its hardfacing and build-up work. It has always done its own repairs on rolls, blades, buckets and teeth, both in the shop and on the job. But company officials say that they are primarily contractors, that they do not want to have an extensive shop organization. "We want to do whatever welding that can be done without too great an investment, but go no further; we don't want to get into another business."

As a result, the company sends out all tractor undercarriage components and any other jobs that would require special equipment and techniques for efficient repair. It retains all work that can be accomplished by hand or semi-automatic welding.

The company's three portable crushers are rotated into the shop for repairs during the winter months. Work done, for example, on a Universal model 880, with 250-ton per hour capacity included the following:

Rolls were rebuilt.

Broken guards, frames, bolts were repaired or replaced.

Extra guards were installed as needed for safety.

Wear plate inside the hopper was replaced.

Main bearings were pulled and inspected.



Worn crusher rolls get S. A. Manganese wire for filler followed by S. A. 53, a high carbon, high chromium overlay material by American Manganese.



Welding a pin for the bucket at left.

Crusher jaws were taken out and given necessary rebuilding.

Usual maintenance checks were made on the engine and the main crusher frame, including lubrication, packing of wheels, etc.

A thorough check was made on belting. The direct drive belt had been replaced but the unit retained all other original belting. Belts and final drive chains

get considerable wear from the harder, more abrasive sand, and the company's crusher operators are instructed to keep a continual check so as to catch belts which are being turned or are fraying.

For hardfacing, the shop uses about 300 to 500 lb. of rod and wire in a month, when equipment has been working under normal conditions. For crusher

*Continued on page 144*

The contractor's Universal 880 crushing and screening plant which was being given a systematic going over with hard facing build-up at the time this photo was taken.





**D**esigners and manufacturers of earthmoving equipment heard some provocative statements at the 12th annual Earthmoving Conference held in Peoria, Illinois, April 4-5, 1961.

**Tires:** Standardization (with resultant lower costs) is being held back by contractors who insist their tire problems are unique and ask for special treads, plys, etc.

**Lubrication:** The contractor will save money when equipment and component manufacturers and petroleum suppliers can agree on lube applications for particular parts.

**Earthmoving with nuclear explosives:** How would you like to excavate 30 million cubic yards with five pushes of a button?

The conference, sponsored by the central Illinois section of the Society of Automotive Engineers, heard a review of tire problems in earthmoving delivered by James G. Berry, account manager of automotive sales in the tire division of United States Rubber Company. He said that tire cutting and the general abuse experienced in rock work, for example, are not the only areas of concern today. Ruptures and separations have become problems due to the intensification of operating conditions.

The stepped-up power of the equipment now in use is another factor in tire wear. Separations brought about by loaded units traveling at high speeds have limited, as a rule, the raising of haul speeds to that which most of the modern, large-capacity earthmoving rigs are capable of. But even when carcasses become more resistant to these cuts and ruptures, Berry said, there will remain the problem of longer tread life under these conditions.

Basic tire expenditures, he said, run to 10 to 15 percent of the machine's original cost, and afterwards can represent as much as 45 percent of the operating expense. But efforts to lower these costs are being impeded, he said, by users' insistence that their own problems are unique. The tire manufacturer must now supply five different types of tread designs to match different terrains; "Does this mean," said Berry, "that contractors actually change treads every time they move to these different jobs?"

There is as much engineering represented in the design and construction of a tire for earthmoving use, he said, as there is in a sizable bridge. And advances are continually being sought. For example, crude rubber has been needed for off-the-road tires up till now, but experiments currently being conducted with synthetic materials reveal favorable opportunities. These tests, Berry said, may result in a good synthetic off-the-road tire and will probably work toward lowering the cost of crude rubber tires.

Other new developments in tire design lie in the change of the tire shape itself, with new attention being given, for example, to the characteristics of the aircraft tire, to the strengthening of the carcass, and to wider tire rims.

H. G. Rudolph, Jr., engineer in the automotive division of Socony Mobil Oil Company, Inc., was asked why lube manuals for equipment specify so many different types of lubrication for the same part or component. He said that, first of all, the petroleum

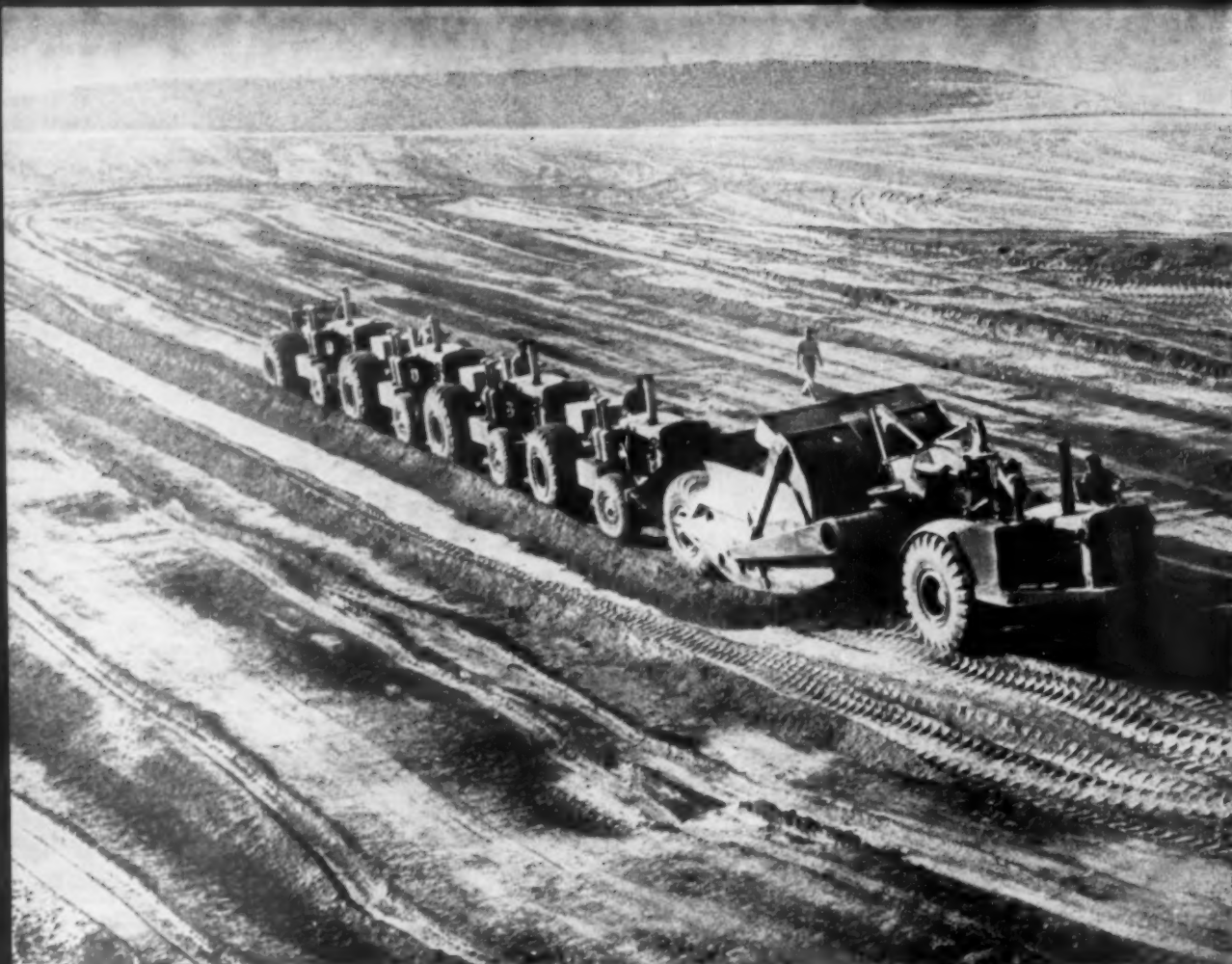
*Continued on page 128*

## **For Lower Job Costs:**

# **One All-Purpose Tire, Grease, Engine Oil?**

*Help us standardize, suppliers tell  
equipment makers and contractors  
at SAE Earthmoving Conference*

**By James R. Cummings,**  
Associate Editor



Cutting no more than six inches deep in clayey sand, a Cat DW21 scraper makes a fast loading pass, tandem-pushed by four turbocharged DW20 tractors. (1) As the loaded scraper pulls away, another DW21 moves into position and DW20 tractors peel off to get behind it. (2) Ten seconds after breaking contact, the rear tractor touches an empty for another loading run. (3) Fifteen seconds after breaking contact, another loaded scraper is well on its way, and another empty scraper is being rapidly filled—150 seconds for each of the three to five scrapers to complete a load-and-dump cycle on an 800-foot haul.

## Novel Pit Loading, Transfer Station, Cut Long-Haul Costs

Resourceful job planning backed up by unusual equipment modifications and use is rewarding a southern California earthmover with a spectacularly fast and low-cost earthmoving operation.

Earthmover Earl Brown is the contractor. His job: to provide 3.2 million tons of imported fill from a state-owned borrow as part of the new San Diego Freeway south of Los Angeles. He moved 2,700 to 3,000 tons of fill per hour with from three to five DW21 scrapers loading in the pit. Such production, phenomenal even for the haul distances, stems from four elements: (1) excellent haul plan-



Loaded scraper from pit is about to move across the grizzly where, straddling the hopper, it will be weighed. Ground-level design speeds scraper movement on and off.

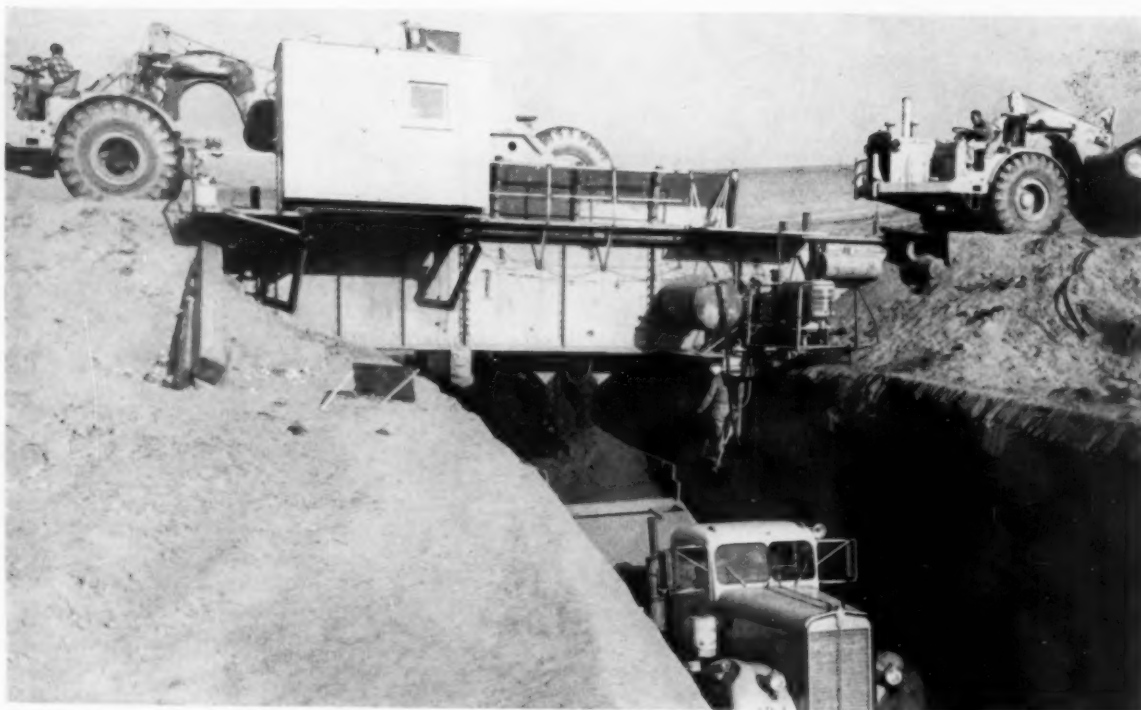


At the transfer station, the weigh-master adjusts dial scales for a zero reading before the scraper moves onto the platform, then quickly notes the gross weight and signals to unload by yanking the bell cord.

ning; (2) construction of a combination bridge, scales and weigh hopper for simultaneously unloading DW21 scrapers and loading long-haul rigs; (3) use of a "train" of DW20 tractors for scraper pushers in the pit; (4) turning DW21 tractors into 60-ton long-haul units by having them tow specially modified bottom-dump semi-trailers.

The foregoing are the essentials. Closer examination shows their inter-relation.

The equipment modifications and innovations have paid off because of excellent borrow pit excavation planning. Project engineer Dave Sagehorn's and



Combination bridge, scales and loading hopper is moved into position as a unit. A single operator stands on a stage below. These DW21 scrapers require only 25 seconds to weigh and discharge 27 to 35 tons.

owner Earl Brown's thorough understanding of equipment operating costs resulted in a haul operation that could move the fill profitably under the winning bid price. The borrow area lent itself to efficient pit operation. It was located on a 5 percent sloping hillside. The soil was clayey sand. The area to be worked was expansive enough to as-

sure movement of equipment without traffic congestion.

Brown and Sagehorn reasoned they could be competitive and make a profit only by coming up with some fresh ideas. They decided to get material out of the pit with fast movement of a minimum of scraper equipment, then transfer quickly from scrapers to long-haul equip-

ment, keeping the haulers out of the soft pit and the loading cycle.

Transfer from the scrapers to the haulers without intermediate handling presented the biggest challenge. Drawing board study resulted in a novel scales-bridge-hopper unit into which the DW21 scrapers could fast-dump after a momentary

*Continued on page 138*

The secret to keeping the sandy pit and fill areas smooth for fast-movement of machinery: a BeGee towed by a DW20 tractor.



Skillful, high-speed maneuvering of pushers keeps all four machines within inches of each other when circling to pick up an empty scraper. Note two-tooth hydraulic rippers on the rear DW20 tractor, the three-ton ballast on the others.





# CATERPILLAR REPORTS

*On the following pages:*

Wheel Tractors on Trial

Heavy-footed Operators Wanted

How to Buy a Used Machine

What Size Machine for You?

Special Report on Custom Track Service

Wheel Loader Does a Crawler's Job



# Power shift 630 and 631... nine speeds with

For six weeks the powerful new Cat 630 and 631 wheel Tractors were on trial before the toughest jury in the construction business. These new power shift machines and the straight shift DW21 were put through their paces before 1300 contractors who gathered to see for themselves if these units lived up to their promise.

Now the evidence from that demonstration is in. Electronic scales and stop watches wrote the story in ledger-book terms. The facts are here for you to judge.

The three machines worked in sandy loam on a 1500-foot haul under identical conditions. They hauled more than 240 loads. The Cat power shift transmission proved how it automatically adapts machine power to job conditions and thus boosts production. In the demonstration, it helped the 631 move 18% more dirt than the DW21—and at the DW21's low cost per yard—the lowest in the business. Complete data are listed in the table on the next page.

## **POWER AUTOMATICALLY MATCHED TO THE JOB**

Contractors who watched the new 631 and three-axle 630 got a new

feel for the things that contribute to production. A new 420 HP Cat Engine provides the power for these rigs that have a heaped capacity of 28 cu. yd. (The 630 when used with 482C Scraper handles 35 cu. yd. heaped.) But capacity and power are only part of the reason for their superior performance. Even more important is a totally new concept in power shift transmissions. The 630 and 631 *automatically* adjust themselves to underfoot conditions thus providing top usable speed at all times. With a single lever the operator can make three shifts that result in nine speeds. And a shift indicator tells him when to shift!

In each speed range selected by the operator, the transmission provides three automatic shifts. Thus, by moving the lever to first range, the new 630 or 631 leaves the cut in torque divider drive—25% of engine torque being multiplied by a converter before joining the 75% of torque that is transmitted directly to the range transmission. As speed increases, the transmission automatically shifts to direct drive, then to overdrive for the most efficient use of power and for maximum speed. The same cycle is repeated in each speed range and downshifting is also automatic.

the  
evidence  
is in  
...you  
be the  
judge



# three shifts, boost production

This new Cat power shift makes these machines so easy to operate that the demonstration, though it proved their superiority, does not indicate the full advantage you'll get on the job. Contractors who operated the machines were pleasantly surprised with the easy shift. They could feel the unit shift, could see each shift on the shift indicator but all shifting, up or down, was smooth and quick. From a dead stop, the machines were automatically shifting out of torque divider drive in about 15 feet; were in overdrive in less than 100 feet and showing the operator when to change to second range. Most of the contractors soon realized that this job matching ability of the 630 and 631 was going to pay off in perhaps a less spectacular way. They realized that here were machines whose production would not be greatly affected by the time of day. Operators don't tire nearly as much and would still be moving the machines at the most efficient maximum speed at the end of a shift as well as at the start. Although the production shown in the demonstration was good, you could expect even better results on your own job when results were checked at the end of a full day or the end of a week.

## FAST, EASY OPERATION

There are other ways, too, in which these new Cat machines make it easier for an operator to maintain top production. Cable controls are air actuated and take only half the effort to operate as formerly. Trying the machines themselves, the contractors found

(continued on next page)

## HERE ARE THE FACTS

<b>Material:</b>	Sandy loam, 3000 pounds per bank cubic yard			
<b>Conditions:</b>	Haul road firm			
<b>Distances and Grades:</b>	Haul, 750 feet, 2% favorable grade Return, 750 feet, 2% adverse grade			
<b>Tractor-Scraper:</b>	DW21	631	630-482	630-482
<b>Pusher:</b>	D9	D9	1 D9	Tandem D9s
<b>Ave. Load Time:</b>	0.60	0.60	1.00	0.50
<b>Ave. Load:</b>	20.8	22.8	26.3	28.1
<b>Ave. Cycle:</b>	2.1	1.95	2.45	2.0

These are cumulative, based on 16 demonstrations. The Caterpillar 630 Tractor-Scraper, and the DW20 Tractor, a straight shift machine, were not included in the demonstrations.



## COMMENTS FROM A TOUGH JURY

Q: What impressed you the most about the 630 and 631?



George H. Langenfelder, Pres., C. J. Langenfelder & Son, Inc., Baltimore, Md.: "When other big machines hit tough spots, they bog down because the operators cannot shift fast enough.

The 630 and 631 automatically shift to meet job conditions. They should roll right on through and help keep production high."



Hugh Steele, Pres., Hugh Steele, Inc., Atlanta, Ga.: "These machines look much stronger, bigger and faster. The air-actuated cable control should cut down on wear because it is either

in or out. The steering looks like a big improvement, too, because it is simpler and more rugged."



C. D. Missimer, Job Supt., Albert Bros. Contractors Inc., Salem, Va.: "They ride better than anything I've ever been on. It's just natural if you keep an operator comfortable and happy,

he'll be able to produce better. Not only do they go faster, but an operator can stay with them without getting beat up."



V. N. Green, Pres., V. N. Green Co., Charleston, W. Va.: "The power shift ought to speed up cycles and it looks more trouble-free. Another thing, I like the easy servicing. Both machines appear real easy for the mechanics to service. These machines will get back on the job fast. And that's important."



(continued from previous page)

that not only are they easy to operate, but there is still a built-in feel of control. An improved cable saver automatically disengages the control to prevent double blocking. Many observers felt that the big, lowbowl scrapers load easier, more evenly. Test results backed this feeling: same pusher, same load time as the DW21 but 10% more load. They observed the even boiling action that breaks the load front and back leaving practically no void behind the apron. Trying the new two-jack steering on the 631, they commented on the automotive feel-of-control that has long been famous on the DW21. The three-axle men were particularly pleased with the steering on the 630 and its shorter turning ability.

Finally, the contractors at the demonstration saw why these new haul units are the easiest to service ever designed. As factory personnel pointed out, the engines are very accessible and the complete tractor is unitized. The fan is attached to the radiator as one unit. The engine can be removed without disturbing other components. Both transmission units, torque divider and range transmission, can be removed individually without disturbing the engine. On the 631, the dash swings out and the crankcase guard is hinged to expose the engine for service work without removing it. On the 630, even the fenders are hinged for easier servicing of the big, new design 29.5 x 35 tires.

As one contractor who saw them in action said, "No matter how you judge a machine, you have to admit these two are great!"



"I BOUGHT FIVE 631s and I think Caterpillar is shortchanging itself," says A. A. Baxter, San Diego, Calif. "My experience on this sewage treatment plant site preparation job indicates that the published figures for this machine are too conservative. I believe I know why."

"When cycles are being checked, operators on the direct drive machines naturally work hard and make all the shifts. During an eight-hour day, they simply can't maintain that pace hour after hour."

"But they can on the 631s. Operators get a lot more out of this machine with a good deal less strain on their part. For example, on this particular job, 1000 feet of the haul is 16% adverse. The operators simply put the 631s in first range and the power shift transmission does the rest. They've found they can travel well over 50% of the grade in first range overdrive."

"The end result is that I am getting much more yardage per day in comparison with the DW21s than the Caterpillar figures indicated I would."

## THE INSIDE STORY

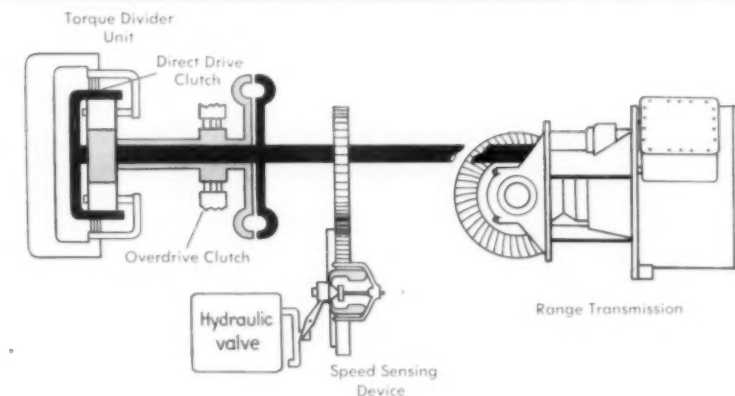
How the new power shift transmission gives nine speeds. . . . Why it likes a "heavy-footed" operator

The power shift transmission on Caterpillar wheel Tractors is unique.

It gives you a torque converter's ability to balance speed and torque to suit underfoot conditions, but for high-speed operation on the haul road it cuts out the torque converter and gives you more efficient direct drive and overdrive. It gives you three manually-selected speed ranges and, in each range, it automatically shifts up or down through three types of drive for a total of nine forward speeds.

Although it is a simple mechanical system, it can be made to shift when not really required. But this can't happen if you keep the accelerator floorboarded. A look at the inside of this transmission (see diagram above) shows you why.

A range transmission is mounted at the rear of the machine and is operated manually with a single lever control. This one lever



gives you three forward speed ranges, reverse, neutral and a special load range.

The automatic transmission is mounted right behind the engine. It consists primarily of a planetary gear set, a torque converter and two hydraulic clutches. It gives three types of drive—torque divider drive (with 25% of engine torque multiplied by a converter and 75% bypassing the converter)... direct drive with output shaft speed matched to engine speed... and overdrive, which is still direct drive, but the output shaft turns 1/3 faster than the input.

The automatic shifting is accomplished by means of a simple mechanical speed sensing device and a hydraulic valve that activates the clutches. A flyball control is driven by the drive shaft. As the machine speed picks up, the flyballs swing out and at a given RPM move the hydraulic valve engaging a clutch to shift up from torque divider to direct drive.

This locks the converter out of the system. At a higher RPM this control system disengages the first clutch and engages a second clutch which changes the gear ratio to overdrive. If the machine slows down, the process is reversed thus giving automatic downshifting. A shift indicator (tachometer) shows when a change in speed range up or down is needed.

Since the automatic system is controlled by speed, it can be made to shift when not actually required. Let up on the accelerator and the transmission will shift down as if the going were getting tougher. The way to keep it most productive is to keep the accelerator floorboarded all the time. Then you'll always have the right speed and power for the job and you'll be taking full advantage of a transmission designed specifically for the kind of machine you're using and the kind of work you're doing.



# A used machine can be a Good Buy...if you're careful

By Walter Schubert, General Manager,  
Royal Equipment Co., Houston, Texas



This rental equipment company buys only used machines. Recently, it earned \$10,000 on a used D6 Tractor before spending a cent on it. Here, this company's general manager tells how you can be sure of top value in used equipment.

We're in the rental equipment business and our machines have to make money two ways.

Obviously, they have to make money for *us*. And just as important, they have to make money for our customers. That means, at a reasonable rental rate, they have to deliver good performance. If they don't, you know the answer. At the best, we get a squawk. At the worst, we lose a customer.

Now, we rent out only used equipment. That may sound as if we're taking a big risk. But we've found a sure way to buy used machines that do a money-making job both for us and our customers. We buy used equipment only from our Caterpillar Dealer.

Does it pay off? There's one used D6 we bought that earned \$10,000 before we spent a cent on it. And there are others with just as good a cost record.

Our equipment is all either a "Bonded Buy" or a "Certified Buy."\* These are machines that the dealer reconditions, classifies and warrants in writing, so we know what we're getting and are protected for the length of the warranty.

We have complete confidence in his Bonded and Certified Buys. In an emergency, we'll even buy one of his used Cat machines without seeing it and have him deliver it direct to our customer's job site.

There are several other reasons we specialize in used Caterpillar equipment. Most of our customers demand it—it has a terrific reputation for doing a job. Upkeep's very low, too, because Cat-built rigs are rugged and, of course, we have the advantage of that warranty period from our dealer. And the equipment retains its higher value: when we want to sell, we can get a good price.

\* BONDED BUY — Cat-built machines, carefully reconditioned, backed by the dealer's written bond up to \$10,000, assuring parts and service protection for the warranty period (agreed to at the time of sale). CERTIFIED BUY — a written warranty covering units of any make in good condition. Caterpillar Dealers also offer BUY AND TRY DEALS which include a written, money-back guarantee agreement on machines not in the above classifications.

# How much machine is enough?

**Two Florida contractors. One has D6s, the other D7s. Both have the right machine. Here are some ideas on how to make sure you don't choose too little of a machine or too much.**

Northwest of Tampa, Lamonte-Shimberg Associates, Inc., uses a D7 to develop homesites on 700 acres of sandy land.

Nearby, J. & J. Land Clearing Co., Inc., Pinellas Park, prepares sites scattered through the Pinellas Park area with a D6. Typical terrain is sandy clay.

Which contractor has the best machine for the work? The answer's easy: *both* have. For different reasons and for the same reason.

The D7 Tractor is just the right size for the work it does—it can easily handle every task, from rough clearing to fine grading. But any tractor in the D7 size could make this claim. However, the D7 does its work in wet sandy conditions and it holds up. Size and type of machine are only two factors to consider when buying a machine. Unless a tractor also has a predictable service life that is favorable it may be "too little" regardless of its size.

Horsepower and size are only an indication of how much work the machine can do in a given time; it is no indication of how much that work will cost the tractor owner. So, the real question facing equipment buyers is, "what size machine and how much quality do I need?" True quality pays off in long life. For example, this D7, working in wet sandy conditions, has 2200 hours on the lifetime lubricated rollers that have caused no trouble and no rebuilding. The tractor has proven to be big enough, size wise, and plenty "big" when it comes to predictable *low-cost* operation. The machine stays in the same area for long periods so highway size and weight restrictions don't matter. And it's stayed on the same kind of hard work long enough to determine it is "more than enough" machine in terms of long life and reliability.

On the other hand, J. & J. Land Clearing needs to move its D6s quite often. So the smaller size and weight, which permits easy movement on highways, is important. Also, its owners feel it has all the power needed. Caterpillar dependability keeps the machine going in the roughest work. With 2300 hours on this D6 Tractor, the oil clutch has caused no trouble and doesn't even need adjusting! The lifetime lubricated rollers are still in good condition.

The kind and amount of work you do will determine the size of machine that best suits your needs. The bigger



D7 Tractor clearing land for Lamonte-Shimberg Associates. Size and weight were no problem to this contractor, so he chose a larger machine for extra power and operating speed.



D6 working in sandy clay for J. & J. Land Clearing Co. This machine handles every job it's called on to do, is always available, and its smaller size makes it easy to move from site to site.

machine will produce at lower cost if used to its capacity. But machine size is only an indication of the amount of work it will do. The cost of doing that work must also be considered. This is more difficult to predict. Perhaps the best method is to look at the reputation of a particular make of machine, look at its design—features that will contribute to long life—and look to the dealer that stands behind the product. Your Cat Dealer is a man that can help you in checking the facts. He brings you his knowledge of machines and what they've done for other contractors with similar problems. He can help analyze what it will cost to handle a given amount of work with the machines you are considering. His interest is getting you the best machine for your business since his business is entirely dependent upon customers like you. He knows "how much" machine you need and he'll work with you to determine the best size.

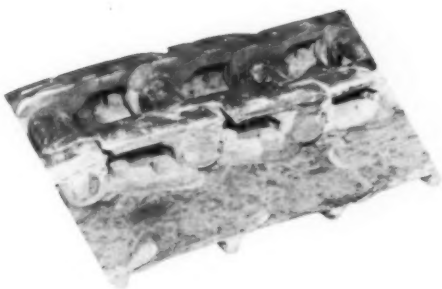
## Special Report to Users of Caterpillar Equipment: **Custom TRACK SERVICE**

# Custom Track Service saves coal stripper \$3298 by adding 3800 hours to track life

A coal stripper, ripping and 'dozing rocky overburden 7 days a week around the clock, was averaging 2300 hours of life before he replaced most of his totally destroyed track group parts. At the suggestion of his Cat Dealer, the stripper tried new, larger-size undercarriage parts. By following recommendations of the dealer's undercarriage specialist at 2440 and 4030 hours, the

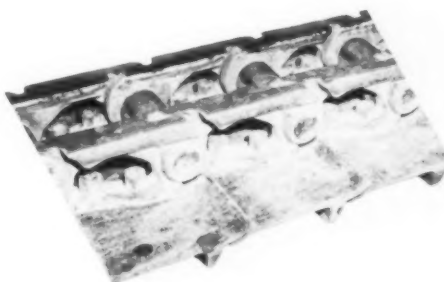
undercarriage went a total of 6100 hours with only pin and bushing replacements . . . and all but the shoes were rebuildable instead of scrap! Up to this point, Custom Track Service saved the stripper a \$3298 cash outlay; and since he was able to rebuild the links and reuse the pins and bushings instead of replacing with new assemblies, he realized additional savings.

### PAST EXPERIENCE



ALL BUT SHOES READY FOR  
SCRAP PILE AFTER 2300 HOURS

### PRESENT EXPERIENCE



COMPLETELY REBUILDABLE  
EXCEPT SHOES AFTER 6100 HOURS

### HOW CUSTOM TRACK SERVICE HELPS LOWER COSTS

Custom Track Service, available only from your Caterpillar Dealer, is designed to help you get the most possible service from undercarriage parts and thus cut costs. Factory-trained specialists are ready to help solve your particular track problems. They can give sound recommendations to help you get the most from your undercarriage.

They can advise you on maintenance . . . help you tailor the many special undercarriage parts and track options available to meet various job conditions. As a

result, costs per hour go down and profit and machine availability go up.

These undercarriage specialists are backed by modern track undercarriage rebuilding facilities manned by experienced personnel . . . by the largest and most complete stock of standard and special application parts available . . . by Parts Exchange Assemblies that keep tractors working and earning.

Check with your Cat Dealer and learn how Custom Track Service can help you to reduce costs.



Lee Vickers (right) and Jewell Finney.

## The only machine they had was a Cat 944, so . . . They did what couldn't be done with (most) wheel loaders

Until recently, you could find pit run iron ore—two inches and less in size—right on the surface of the ground around Gladewater, Texas. So road contractors had plenty of low-cost base material. But in the last few years it has gotten scarce and expensive. Lee S. Vickers and Jewell Finney saw this as an opportunity to go into the rock crushing business. Their Atlas Construction Co. opened a crushing plant in Gladewater in June of 1960.

In their 160-acre pit, they have an almost unlimited supply of limonite iron ore with plenty of hematite and mortar sand. But before tapping this raw material, Vickers and Finney had a couple of tough problems to solve. First they had to clear 25 acres of pecan and oak up to 20 inches in diameter. The only machine they had was a 944 wheel Traxcavator, bought for use in the crushing operation. This isn't the type of machine they'd ordinarily choose for a tough clearing operation but it was available. They decided to try it. And it did the job, with no trouble.

The next task was preparing the site for the crusher and building a settling basin for water used in washing crushed ore. Again, the rugged 944 handled all the work, doing plenty of really heavy excavating in moving 20,000 yards of rock and gravel and without a hitch.

Now, after putting them in business by handling work that many wheel



After clearing and excavating to prepare the crusher site, 2-yd. 944 Traxcavator now handles all loader jobs at the crushing plant of the Atlas Construction Co.

loaders couldn't do, the 944 is still on the job every day. It excavates, loads the hopper of a 10" x 24" jaw crusher and loads out trucks at the rate of 1200 yards of pit run material a day. As Lee Vickers puts it, "The 944 does everything but crush rock for us!"

How did Vickers and Finney come to choose a Traxcavator? Lee Vickers is a good man to ask. He had 10 years of experience with wheel loaders as city manager of Gladewater, Orange and other Texas cities before joining Atlas Construction Co. He says, "One look at the 2-yd. 944 in action convinced me that the seven years of Cat research that went into it had really paid off. It's the easiest machine to

operate I've ever seen. It's unusually safe, fast and has as much power (105 HP at the flywheel) as we'll ever need.

"We were offered some big discounts to buy other loaders, but we were more interested in long-term economy and steady production than initial price. When I was in city management work I saw the fallacy of buying low bid. Often you have a lot of repair problems and spend much more to keep the machine going than a good machine would have cost in the first place.

"Frankly, we couldn't be more satisfied with the 944, and if we ever expand to the point where it can't handle the volume, we'll get another."

**For the best in new and used machines, and the best in parts and service—see your Caterpillar Dealer**  
Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

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**DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT**





**Kenneth F. Park**

*Editor's Note:* The response to our offer of extra copies of Kenneth Park's series, (see page 75 of March, 1961, Roads and Streets) has far exceeded our anticipations. Enquirers who haven't already received their requested copies will get them soon. We are, however, not mailing out any of the four parts of Mr. Park's series until the part in question is in the hands of readers.

Part 1 in March, as many will recall, consisted of a historical review of the scraper's development and a discussion of how management should approach the utilization of earthmoving equipment. Part 2 in April was concerned mostly with push-loading and pit operation. Part 3 in this issue gets into other phases of the scraper job. Part 4 in June will conclude with an analysis of cost factors necessary for realistic and accurate job planning and bidding under today's tight competitive conditions.

Extra copies in multigraph form of any or all of the 4-part series are available to contractors and others who would like them for use by their staff people. Those who have already written will eventually receive the requested number of all four articles. Those who are still interested, address the Editor, Roads and Streets, 22 West Maple Street, Chicago 10, Illinois. Please use your letterhead in writing.

## Earthmoving— Mostly About Scrapers

### Getting down to details on scraper production analysis—Part 3 of 4 part review

**By Kenneth F. Park**  
Consultant

Scraper bowl sizes are generally rated now upon SAE recommendations. Acceptance of a method of establishing bowl sizes was based originally upon a set of "rule 'o' thumb" factors which, applied against those ratings, gave net loads in keeping with obtained loads. These were applied in the following manner, the figures being percentages of total heaped rating in pay yards per load:

- For Sand, 90 percent
- For Earth, 80 percent
- For Clay, 70 percent
- For Rock, 60 percent

It was found, of course, that sand laid flatter than a 1 to 1 slope—but rarely had as much as 10 percent bulking. Clay generally bulked more than 30 percent but rose steeper above the sides. These figures however are still not too bad for quick calculations. Such amounts represent maximum load expectancies. All factors judged fairly accurately, these figures give fair average expectancies.

#### Figuring Scraper Loads

In order to obtain good loads, it becomes necessary to look at ma-

terial weights and swell; friction in the bowl and attempted load; traction; the loading power; the grade advantage if any; elevations.

**Weight:** Remember, loads are largely a matter of weight rather than volumes, so are considered most important.

**Swell:** The action that indicates the loose volume a mass takes.

**Friction:** A deterrence in dirt travel, in the bowl, and upon the earth itself.

**Traction:** Surface grip on the surface upon which they work (tracks, tires).

**Load Power:** The amount that determines the amount of the load in pounds or yards.

**Grades:** A little is advantageous. Preferably about 8 percent down (loading).

**Elevation (above sea level):** Takes away load power, reduces performances. In the average unit about 3 percent for each 1,000 ft. above 3,000 ft.

Aside from weights and swell, which are quite easy to figure, or obtain, friction is a difficult figure to determine. Extremely coarse, highly abrasive material will increase loading time beyond prac-

tical, or reduce the pay quantity per load. One sure way to counter high-friction conditions is to increase the push power. In order to figure friction loss, the writer has a set of curves developed through the years, giving rough percentages. These were made from weight and volume checks and material descriptions. Some kind of percentage loss, repeated often enough, will finally develop an acceptable pattern. A slick, oily kind of material, similar to a shale, maybe micaceous or schisty, has a self-lubricated action in going into a scraper that improves its flow into big, quickly obtained loads. The friction of loading surfaces, which add to, or detract from, track or tire work, can be ascertained by an observed check on tire or track spin, or slippage, with engine at normal (or checked) rpm's.

#### Effect of Grades

On grades, favorable or adverse, a gross weight is affected at the rate of about 20 lb. per ton. Pull is added to any of the tractor's pounds of pull in down-hill travel. It is subtracted in uphill travel. Supposing a unit weighs a gross of 100,000 lb., or 50 tons. If it has 20,000 lb. of pull maximum, that is increased to 20,000, plus  $(5 \times 20 \times 50) =$  a total of 25,000 lb. on a 5 percent downgrade. Going up 5 percent, the 20,000 is reduced by 5,000 to 15,000 lb. The 15,000 lb. is the amount of rimpull available for other work. By these corrections, grades have their effects upon all machines. And the work any unit will do should be changed in relation to the presence of slopes over which it works.

Suppose we put together a big pusher-tractor as described; with it, a scraper like that just mentioned. Let's have good dirt weighing about 3,000 lb., swelling 30 percent. A 3,000-ft. haul will give the need for a spread which can be figured. No grades.

The 45 heap yard capacity of the scrapers should obtain about 80%  $\times 45 = 36.0$  pay yards by calculation. Let's see what power will do.

Pushing power ..... 60,000 lb.  
(or loading power)  
Scraper ..... 20,000 lb.  
Gravity ..... 20,000 lb.

Loading Power....100,000 lb.

#### Loading Rate

Our assumptions have said a pound of dirt per 1 lb. load-power in 1 minute. A glance at load curves says we can get, or expect to get, the 100,000 lb. of load in a minute. It further says 90,000 lb. in 0.8 min. The better amount would produce say 1,175 pay yards if there were scrapers well fitted to the work, per hour. The lesser loads could produce 1,200 pay yard in the same time (35¼ loads of 33.33 pay yards vs. 40 loads of 30.00 pay yards.) A scraper is presumed to make a cycle about as follows:

Loading, 1,200 bank yards an hour ..... 0.80 minute  
Dumping (it can be done in less) ..... 0.50 minute  
Turns and spotting 0.50 minute  
Acceleration and braking (variable) ..... 1.0 minute  
Travel, 6,000 ft. round trip ..... 1.80 minute  
Scraper cycle . 4.60 minutes  
Trips per 50-min. hour ..... 10.87  
Pay yards per 50-min. hour ..... 326.10 each  
Number of scrapers to fit pusher yards ..... 3.68  
(probably use 3 or 4)

Three scrapers used here would give a yardage cost of about 9.92 cents per cu. yd. (978 cu. yd.) Four scrapers used here would give a cost of about 10.16 cents per cu. yd. (1,200 cu. yd.).

Loading for 1.0 min. sets up a scraper cycle of 4.80 min. and say 10.43 trips per 50 min.—347.63 cu. yd. per 50-min. hour each. It would need 3.38+ scrapers to keep the pusher at top performance. They would move 1,175 cu. yd. an hour. (Again, the contractor would probably use 3 or 4.) Three scrapers used here would give a yardage cost of about 9.30 cents per cu. yd. (1,043 yd.). Four scrapers used here would give a yardage cost of about 10.38 cents per cu. yd (1,174 yd.).

Such calculations as this cut the whole thing pretty thin, but only by their use are most precise performances possible—plus the monetary gains of superior output. Often the cheapest yardage does not produce sufficient hourly yardage to reduce job overhead. At such a point Income and Outgo have to be juggled to establish an

equilibrium. Someone in an earth-moving organization should have sensitive reactions to such situations, be in full command, and be able to effect the necessary changes to establish a balance.

#### Scraper Factors Explained

Loading. The 0.8 min. is a figure resulting from a great many studies indicating its desirability.\* 1.0 min. comes from the studies showing in what time and at what quantity a normal helper would develop its own drawbar (push pounds) in a minute. It is felt that no longer time should ever be taken. It is more costly per yard above 1.0 min.

Dumping. Through the years 0.5 min. has been taken because it suits a calculation and normal performances well. It can be improved.

Turns and Spotting. This figure, can be improved—and timing will (very often) show less time. It represents a good figure though and fits performance and calculations quite well.

Acceleration and Braking. Both represent travel time, but, as a part of every haul, can be set into a calculation as a unit of "fixed time" rather than "variable." Actually they are a part of travel, and in the above compilation, increase the travel time to 2.80 min. for the round trip. This decreases the average speed from 38.0 mph to about 24½ mph. As the difficulties of attaining a high speed increase, an increase of time should be made, say in increments of 0.5 min. Several means of checking such time have been resorted to, in which enough familiarity has developed to insure reasonable accuracy. 1.0 min. to 1.5 min. are sufficiently accurate for most hauls in which there are no materially important grade changes (to cause several varying speeds) over a haul or soft footing.

Travel. If horsepower and weight are well related and maximum speed is calculable, the writer uses that full figure and makes any corrections to "acceleration" to account for any expected reduction in speed. Such a rig as that as-

\*See "How to Figure Your Best Scraper Loading Time," by R. L. Peurifoy, Roads and Streets, December, 1960.

sumed in the calculation should have about 400 lb. of gross weight per 1 belt horsepower. Such a ratio insures quite good performance. Some of the best today have as little as 300 lb. of weight to the horsepower. Those kinds of machines should travel well, accelerate quickly, travel adverse grades favorably. The more weight per horsepower, the more sluggish a unit. A 350 hp rig could have a gross of 140,000 lb. and still perform creditably. Most makes of these kind of units have specification sheets to indicate speeds.

Trips per 50-min. hour. This is the cycle time for the scraper unit divided into 50 min. (83.33 percent). This efficiency is a normal expectancy for these units. The 10 min. lost is presumed to take care of small losses such as changes of blades, cables, etc.

Pay yards per 50-min. hour. A multiplication of the trips per hour times the bank yards per load. The term "pay yards" is used because it represents the actual amount for which the contractor is supposed to receive for his contract price. In Western U.S. the term is a common and well understood one.

Number of scrapers to fit the pusher yards. Once an hourly scraper production is established accurately, its rate divided into the hourly rate of the pusher gives the answer. Another means of making the estimate is to increase the time of the scraper cycle to a 50-min. (83.33 percent) efficiency and divide the time of the pusher cycle. For instance: a 5.00 min. cycle would become 6.0 min.; a pusher cycle of 1.5 min. divided into it would give an answer of 4. The answer. Incidentally there is no efficiency factor used in establishing the pusher cycle. If it loads a scraper in 0.8 min., and takes 0.7 transfer time, its cycle is 1.5 min. for 40 loads an hour. The fixing of 0.8 min. for loading and the attainment of 40 loads an hour automatically sets up a transfer time of 0.7 min. in order to satisfy the calculation, or better, the result.

### Tandem Pushing

Now to look at a condition in which tandem pushers proved very superior to one pusher. This was a situation in which help was needed and tandem pushers of

identical ability and specifications were recommended. The material was a mixture of wet sand and river gravel. It weighed 3,650 lb. to the place yard. A single big pusher would have loaded about 60,000 lb. (about 16.5 yards) in a minute. Two big pushers obtained about 95,000 lb. (over 26 yards in the same time). Underfoot conditions were bad so traction and loading were reduced by about 38 percent. The difficulty of loading the material (friction) reduced the maximum drawbar about 15 percent; the rest of the loss came from track and tire slippage. The work was reported much cheaper than by dragline.

Such are the virtues of knowing scrapers and pushers well. The above is a typical condition in which the application of some of the basic principles of this work can be made to pay off substantially.

### Three Pushers

Another nice job upon which big tandem (pushers) had been applied, and by weight checks were producing many loads of 41.0 (pay) yards, was producing 1,400 pay yards an hour. By putting a third similar pusher in the pit, and another scraper or two, the three pushers produced 1,700 cubic yards an hour. The benefit of such an arrangement is that transfer time is reduced to a minimum and more loads go out to the hour. One pusher is starting a load, a second is boosting another on its departure, the third is moving in to help the one then pushing. There is no time in which there is no pusher making a scraper load. Waste time is just about eliminated in the pit.

In a sort of high-ball demonstration we have pushed out as many as 87 loads in an hour. Three big scraper rigs averaged over 700 pay yards each per hour, on a 700 foot haul. Anyone could have done it. There were no tricks, no gadgets, no magic. Just a number of good typical dirt stiffs trying to do a superior job—and trying to get out of the rigs what was said about their potential performances.

### Twin Engine Rigs

There can readily arise the question of the suitability of scraper

units with the addition of another rear engine. They certainly are known to be good. The two engines give a fine weight to horsepower ratio; one tending to assure a snappy performance. There is enough weight over both sets of drive tires sufficient to assure good traction even in poor footing. The excess of horsepower further gives assurance of good grade capabilities. Units with which the writer had intimate contact for long periods of time did a good job.

It was possible at the time to see the need of certain modifications, such as lengthening and raising heights of sides to increase capacities by some six or eight yards. The improvement in costs has been quite apparent. In this somewhat extreme case, is another history of the application of basic principles. Horsepower ratios—enough capacity to utilize tandem pushers properly, etc. Another proof of the versatility of their correctness and the ease and effectiveness of their use. The thing to do, however, is to use them in studying the new machinery in the process of purchasing them, and after their first use, to improve their subsequent use. The processes pay off so substantially that they cannot be overlooked as one of the means of bringing lagging enterprises up to good standards. Again—Basic Principles.

Another of the interdependent works of an earth processor is that of compaction. There has been so much controversial thinking on the process, and so many different tools for the consumption of the work, that it strikes the author as a mighty faltering and uncertain proceeding even yet, though greatly improved. As a member of a committee on soils and compaction for several years, the writer has often said, after a cross-country trip for a meeting, that "much was decided and settled." Mostly the fact was decided that we would have another meeting!

Anyway, there is now a "Tamping Compactor," handled by a rubber-tired tractor, that has been doing excellent work. It weighs from about 36,000 lb. to 92,000 lb. depending upon the ballast used. It has speeds up to about 17 mph; compacts a swath nearly 12 ft. wide. We got above 100 percent

Proctor with an average speed of 10.0 mph in shaley material. With six passes we produced just short of 1,400 compacted yards an hour. On several observed jobs upon which compaction requirements were severe, scrapers placed 1,400 yards an hour and one of these compactors comfortably kept up with that delivery. Too, the tractors are interchangeable with those on the scrapers.

In a package, including pushers, scrapers and the compactors there has been an inspiring and profitable spread of equipment to observe.

### Torque Converters

To return to the twin-engined machines again for just a moment. There are many torque converter arrangements, and their many merits often confuse those anticipating their purchase and use. The idea of having engine power closely follow work demands placed upon it, is logical and desirable, but there are prices to pay for such interdependence. There are always losses in friction in such machines that too often are not accounted for—or losses even, too often, not known to exist. Such losses must be recog-

nized and work limited by their presence. This sounds harsh, but it becomes again only the matter of knowing such things and making proper corrections for them. The machines are wonderful, but their use should be made where their good is greatest.

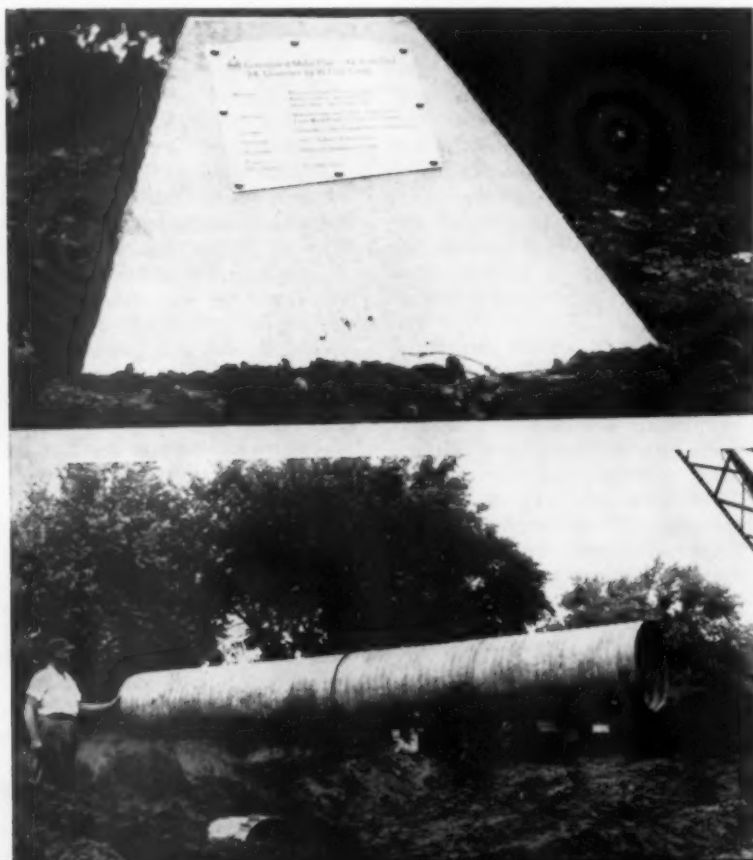
### Self Loading

Self loading is one of the actions credited to twin-engine machines that should be looked at in the light of the Basic Principle, to keep turning back to this phase. One of the big machines will weigh up to 86,000 lb. empty. Its coefficient of traction, in normal footing, will amount to about .55, thus accounting for its ability to load about 44,000 lb. of dirt. By manipulation, with the gravity pull of an accumulated earth load, too, it will ultimately pick up about 20,000 lb. of load. The loading time is too long and the cost of owning and operating high, so that the operation is questionable as opposed to pusher help with more conventional rigs. The big units of this character now cost around \$80,000 a copy. Their owning and operating cost per hour on the West Coast is about \$30.00 to \$35.00 an hour.

The makers of these machines show them being push-loaded. This is logical, and placed where they should be used, the machines are wonderful. Their superiority is where poor underfoot conditions limit standard machines, or severe grades limit ordinary uses. In order to accomplish superior performances and costs with such machines, it is necessary to think in terms of progressive methods—even a possible use of procedure with which the owner is unfamiliar. Again, generally this means the use of old, time-tried, routine Basic Principles of Analysis.

### Tandem Scrapers

A further question of tandem scrapers may arise. The idea is an old one dating back to first use with crawler tractors about 1933 or 1934. By the addition of about 1½ minutes to the cycle, a tractor-scraper added about 50 to 60 percent more yardage an hour for very little more hourly cost. Approaching that same improvement, rubber-tired tandems today have excellent potentials. Once again it is but necessary to know where they belong and how to use them for good results.



### Corrugated Culvert Pipe Relocated After 40 Years

Over forty years in the earth and ready for more. This corrugated galvanized steel culvert pipe was removed from its site and is being put back into the ground for further duty. Re-use is part of a durability study conducted to determine life expectancy of this type of pipe. Its condition was found to be excellent.

The historical plaque (top) marks the location of the pipe as part of a highway improvement program in Pottawattamie County, Iowa. Fabricated from 14-gauge Keystone copper steel, the 16-ft. pipe is 24 in. in diameter. These culvert sheets were produced in 1919 by American Sheet and Tin Plate Company, now a part of United States Steel Corporation. Original fabricator of the pipe was Nebraska Iowa Steel Tank Company, now known as Eaton Metal Products Corp.



**...like a third hand for your operator**

By maintaining the desired transverse slope automatically with Preco Dial-A-Slope, your LW grader operator can devote his entire attention, and both of his hands, to his other controls. Result? Easier operation... more production... and substantial saving in time and money on all your grading jobs.



**LW graders with Dial-A-Slope blade control  
save you time, money**

Where do you use a LeTourneau-Westinghouse grader equipped with Preco Dial-A-Slope automatic blade control? *Anywhere and everywhere!* It is effective on *every* phase of grading—from the roughest to the finest—with these particular benefits in finish grading:

**Reduces grading time by 50%:** A given grade can be completed in up to *half* the time it usually takes. In many cases, finish grade can be attained with *only one pass*—and is usually accepted on the first inspection without need for rework.

**Accuracy of  $\frac{1}{10}$  of 1 percent:** Dial-A-Slope electronically holds the blade at the exact slope the operator has selected. As he manually raises and lowers the toe of the blade to cut the longitudinal grade, the "automatic" end *instantly* follows his every move... maintaining the transverse slope to an accuracy of 1/10 of 1 percent.

**Reduce staking costs:** Your operator carries the slope across the *entire* width of the grade from *one* row of stakes. Intermediate rows of stakes (even on super-elevated curves) can be eliminated or re-

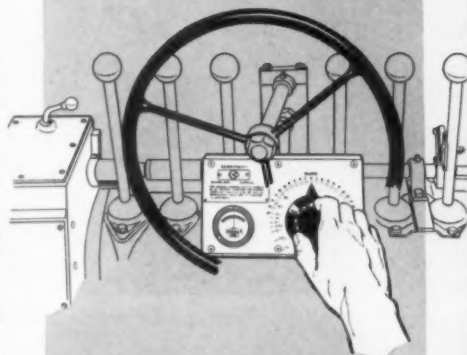
duced. Labor costs for auxiliary help, such as grade-checkers, are also reduced.

**Save material:** By insuring a smoother and more accurate finished surface, use of the Dial-A-Slope will result in more uniform thicknesses, hence substantial savings in costly imported base and/or paving materials. For example, a saving of just  $\frac{1}{4}$ -inch of thickness on one mile of minimum-width freeway amounts to a saving of 195 cubic yards of material.

**Installed easily and quickly**

Preco Dial-A-Slope can be installed on any new or used current-model LW grader... from the 85-hp "330" to the 190-hp POWER-Flow® 660. We will be happy to give you complete information and arrange for a demonstration.

**You're invited to see  
new color film...**



**Feature:** "Dial It"—the Automatic Blade Control.

**Plot:** How Dial-A-Slope thinks for itself.

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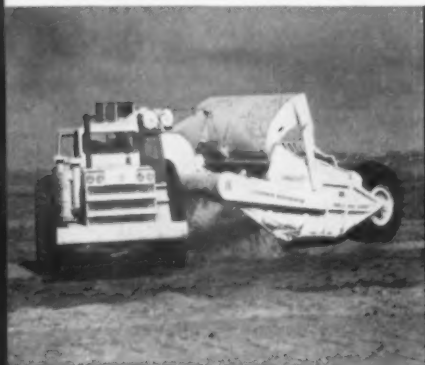
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# Earn extra dirtmoving profits here..



Interested in big scraper profits? Check big LW V-Power B 'Pull' . . . 430 hp, 29 heaped yds. Or 290-hp, 20-yd V-Power "C".



With any LW electric-control 'Pull you can use tandem scrapers . . . double your load capacity at only about 1/2 extra cost.



Make your long haul jobs more profitable with LW 6-wheel C Speedpull® . . . 37.7 mph, 276 hp, 20 yd capacity. 40 yds in tandem.

.....and here with double-value "D"



#### ◀ On production work

LeTourneau-Westinghouse 9-yd D Tournapull® proves out profit-wise on any size job, as either a utility or production machine. 300-to-1 power/wt ratio, plus LW power-transfer differential, keep production high under all work conditions. You also get: permit-free roadability... 30-mph speed... choice of transmissions. And, you can add on second scraper any time for 18-yd tandem operation.

#### ▲ On clean-up work

Interchangeable Hancock elevating scraper *doubles* the D 'Pull's usefulness... picks up windrowed material, cleans up along shoulders, between forms. Electrically-driven slat-type conveyor pulverizes earth, loads up to 10 yds in less than a minute *without a pusher*. Spread time: 5 to 10 seconds. (Also available for use behind "D" prime-mover... an 11-ton Rear-Dump hauler.)

#### Pays a dollar bonus, too

Whether you're interested in the 143-hp D 'Pull\* for one-machine handling on small-yardage contracts, or as an auxiliary unit in your big-production fleet, remember *this*: The "D" pays you a big *dollar* bonus in lowest original list price, and highest trade-in value of *any* scraper in its size-class. Compare prices... and features. See your LW Distributor soon.

\*Trademark DP-2394-DC-2

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Here's a hauler designed to earth-moving "specs", not automotive... the LW Haulpak®. 5 sizes, 22 to 60 tons... up to 550 hp.





Complete aggregate plant as seen from top of pit. Dozer in left foreground is bringing in imported material to correct gradation.

## High-Tonnage Crushing Plant Assembled to Contractor's Ideas

In the Minnesota highway program the contractors doing aggregate production have developed a variety of portable plant setups. The requirements governing the plant design have usually been five-fold for the larger firms: high-speed production when wanted, adaptability to constantly varying pit material, adjustability of screens and flow to produce various sizes, and the ability to meet the new, more exacting specifications and test requirements.

A plant that was put together with such requirements in mind is here pictured. Its owner, Alexander Construction Co., Inc., of Minneapolis, set up this assembly in 1960 for a 400,000-ton production job on U.S. 65 south of Minneapolis. The company's \$1,776,000 contract covered 3.5 miles of flexible base and asphaltic pavement.

This plant's capacity is "right up there,"





The top belt is conveying material into the Telsmith Gyra-sphere. The belt at left center is recirculating material back to the shaker screen.



The Cat D8 dozer operator slotted material downhill to the feeder.

even as judged by latest standards for rubber-tired, ready-to-move units. The plant has turned out as high as 620 tons per hour of crushed and screened material. On the U.S. 65 project, however, high speed was not the chief objective, but rather maintenance of a steady output of specification material when wanted to keep up with the other project work.

The plant's chief elements were as follows:

1. The typical gravel pit on a hillside was worked by a single Cat D8 with U dozer. Material was slotted along the usual radial paths to a hopper, with effort to blend or intermix coarse and fine, to even the plant input. A second D8 dozer imported material, needed for this pit which was deficient in coarser sizes. This dozer's production was controlled to keep rejected oversize to a minimum.

2. Dozed material was received in the hopper of a Cedarapids slag feeder which delivered

Cedarapids 3-deck screen worked material on a recirculation basis. Scalped material seen going into a Telsmith 4 ft. model 48S Gyrasphere crusher at right center.





At left center, TelSmith 18 in. by 32 in. primary jaw crusher with conveyor belt loading to horizontal shaker screen.



Loading 14 tons of aggregate into contractor-built trailer bottom dump trucks powered by Ford F-750 trucks.



Another view of the main production line (see also layout sketch).

a measured flow to a TelSmith 18 x 32 primary jaw crusher.

3. Another belt ride and the material hit the chief screening unit, a Cedarapids 16-ft. triple-deck horizontal vibrating screen, Model CC. Here material larger than  $1\frac{3}{4}$ -in. was scalped by the top screen. The middle screen scalped plus 1 in. material. The bottom screen was a 5-ft. section slotted  $\frac{3}{8}$  in. by  $\frac{3}{4}$  in. which sent  $\frac{3}{4}$  in. max. graded material directly to the stockpile.

4. Scalped material from the two top decks passed to a 4-ft. TelSmith Gyrasphere 48S crusher. Material then was recirculated, using two belts to deposit it back on the upper deck of the triple-screen unit.

5. The reject from the TelSmith secondary was belted to a dust pile. Material from this pile was put through a  $\frac{1}{4}$ -in. screen to produce fine aggregate for the firm's asphaltic hot-mix plant located nearby.

6. The stockpile conveyor deserves special mention here. It is a contractor-built unit, on rubber tires, designed for easy and frequent height adjustment. Stockpile height has been a problem on some of Alexander's jobs, and a belt that could be varied several feet up or down



On the truck is one of the plant's two GM Detroit Diesel 150 kw generator units.

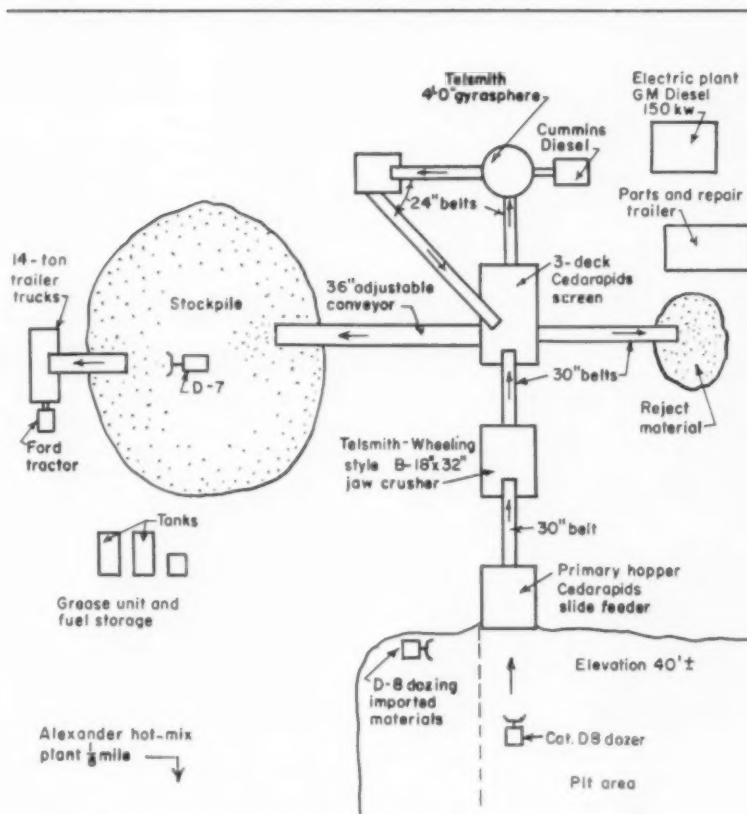


This variable-height stockpile belt helped keep stockpile at desired height for economical re-handling.

was the company's answer in maintaining a good conical pile requiring least dozing for reloading. This 100 ft. by 36-in. belt unit is electric motor driven, with a second motor and clutch for operating a winch line anchored from the top of the toggled support frame.

7. Reloading and hauling out of stone also reflect the ingenuity of the Alexander personnel. A belt-type pit loader, fed by a D7, loaded 14-ton bottom-dump trailers designed for economical over-the-road transport. The company built the first of these trailers in 1938. According to project superintendent T. F. Van Duyn the dumping mechanism was changed to air-over-electric in 1952, and more recently ten additional units were built to the firm's ideas. The single-axle dual-tire design permits full loads without exceeding the legal axle weight limit. Over-road truck-tractors do the hauling.

8. The Alexander plant usually has its own power source. Here the variable-height stockpile belt was powered by a GM Detroit Diesel unit with 150-kw generator. A similar unit ran the motors for all the rest of the plant except the secondary crusher which used a Cummins diesel engine with belt drive.



Schematic layout of Alexander Construction Company's plant.

## Professional Discussion:

# Thoughts on Contract Plans Preparation

*Drafting room practices have lagged, notes this engineer who suggests ways to save manpower, time and money*

**By John C. Rundlett**

Executive Vice President, Clarkson Engineering Company, Inc.

Some of us have been in this business from the days when time and effort meant nothing; from the time when a survey party traveled by street car or train or wagon to its location; from the time when construction men came into the office in the winter to do the design for construction the next year; from the time a construction job shut down completely in the latter part of October. And from the time when the Massachusetts State Construction Budget ran well below \$1 million a year, and when a \$100,000 project required the full resources of the Department of Public Works to process.

These are looked upon by some as the happy days when life was simpler, when you could do tomorrow what you couldn't do today, when you could advertise next year if the plans were not ready this year, when decisions didn't delay projects because you had no target date, and when the labor put into plan production was fan-

tastic, by today's standard.

There is no question that we are basically a conservative group. We are prone to carry along through the years the practices of yesterday. As highway engineers, I am afraid we have fallen way behind in the race for progress. We have been content to let things alone, and there are too many of us who don't put real effort into thinking out new ways of doing things. We perhaps take a negative attitude towards automation and computer work, because unconsciously we feel that we are being replaced by robots, that an engineer will be only a technician who pushes a button.

I think I can say without hurting too many feelings that computer work should be looked upon as the salvation of the engineer. It releases him from repetitive mechanical operations which are tedious, routine, and which, frankly, are not the work of a full-fledged engineer.

Of course, progress has been made in our profession, but slowly; and many methods are still not completely accepted because of

their so-called limitations. Limitations by what standards? Limitation because we do not differentiate in the precision of measurements, limitation because we have not tried to impress on the contractor that he will not lose if he is paid on preliminary quantities providing provision is made for payment of changes, limitation because too many people consider that the original cross-sections taken from photographs are not sufficient for finals. Limitation because we still prepare hundreds of items in a contract.

To sum up, limitation because we as engineers are still generally producing the same type of plans—with the same laborious detail and by the same methods in many cases—as we did at the time when the \$100,000 project was the ultimate and when we could take a year to produce it.

## Will Expedite Awards

I said that I felt we were far behind in our race for progress. We are catching up by the use of better techniques in surveying, photogrammetry, by the use of computers; but in the preparation of plans we are trailing in the race badly. It doesn't make sense in this day, when our program may be \$200 million in one year, to be producing plans as we did when it was \$100,000. It doesn't make sense that one part of our effort, design, moves ahead rapidly, while the other half—the preparation of plans—stands still.

As you all know, great emphasis is placed on expediting the advertising of projects. Rightly or wrongly, our highway program has been stepped up to the point where a fraction of reasonable time is allowed for the preparation of a contract. No allowances are made for the delays due to changes; there is no consideration for lengthy reviews by all agencies concerned with all the personal opinions involved. If you want speed in production, you can and should take a short, hard look at some different approaches to the methods of preparing the plans, and a different approach as to what needs to be on the plans.

Also an acceptance of the fact

*Continued on page 81*

Based on a talk given in the Boston Society of Civil Engineers Lecture series.





**BEFORE:** Jaeger 3" Trash Pump removing very dirty water. Note discharge stream. 3" model pumps 20,000 gph, 4" model pumps 46,000 gph @ 10' suction lift. Give you big capacity plus ability to handle trash.



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# ALPHA

BETTER CONSTRUCTION THROUGH  
BETTER USE OF CEMENTS

## news and notes from the field

### Modern Curing Methods Improve Concrete Quality

When cement is mixed with water it undergoes a chemical change that transforms it into "rock". When it hardens into a mass similar to rock, it is said to have hydrated. Therefore, hydration is nothing more than a chemical combination of cement and water. First, the outside of the cement particle hydrates and a cement gel (glue) is formed. As water continues to soak through this cement gel, further hydration takes place in the cement particle. The process of keeping the concrete damp and at about 70°F until it is strong enough to do the job for which it is intended is known as curing.

#### Importance of Curing

Curing consists of keeping the water necessary for forming the cement gel in the concrete and keeping the concrete at a temperature high enough or low enough so the chemical change to "rock" can take place.

For example, an average 6-bag mix using 1" aggregate can be expected to attain a strength of 3950 psi at 28 days if it is cured properly at 70°F. If the temperature is allowed to drop just 20° to 50°F, this same concrete will be slowed down in its transformation to rock and will have a strength of only 2400 psi. The same proportional differences can be expected at all ages. If during the curing period the concrete is allowed to dry out, such as may happen in hot weather, the chemical change stops right at the point where the concrete loses its moisture. Unfortunately, it is impossible to ever make the concrete good even though water is applied later.

#### Effect on Wearability

Since evaporation occurs more rapidly from the surface of concrete, the length of curing time is the most important factor affecting wearability. A surface that is moist cured for 28 days will result in a floor that is twice as hard as one that is protected only 3 days.

#### Effect on Watertightness

A well-proportioned and workable concrete mix generally contains about twice as much mixing water as is necessary for hydration of the cement. The reason is that about one-half of the water is used to make the concrete workable. As the cement and water hydrates, a gel is formed which expands to fill the voids left by the unneeded water as it evaporates from the concrete. If curing is stopped at one of the intermediate stages,

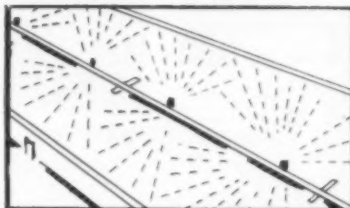
the voids that are normally filled by the gel are left at whatever stage curing is stopped, making the concrete porous and leaky.

#### Effect on Durability

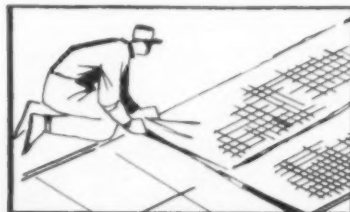
The durability or the ability of concrete to withstand the effects of freezing, thawing and weather conditions is a direct result of how much water the concrete can absorb. If the concrete quality is good to start with and if it has been cured properly, there will be no pores or capillaries through which water can enter and freeze, subsequently expanding and causing scaling.

Air entrainment helps eliminate deterioration caused by freezing and thawing cycles but good construction practices must also be followed—that means good curing.

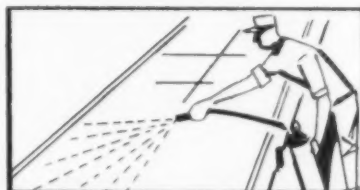
#### Methods of Curing



**Spraying with water** provides excellent results if constantly kept wet. There is a possibility of drying between sprinklings and it presents some difficulties on vertical walls.



**Burlap** which is kept damp during curing period. Recent improvements have made burlap easier to handle, improved light reflectance and increased its fire resistance.



**Membrane compounds** are inexpensive and easily applied by spraying. They are available clear, black and white. Caution must be taken that the film is not broken or tracked off before curing is completed.

**Waterproof paper** furnishes excellent protection against drying by providing a moisture barrier that assures proper hydration. Curing papers that are reinforced last longer, and can be reused several times.



**Plastic sheets** are absolutely water-tight, are light and easy to handle, and provide excellent protection. They resist rotting and mildew and can be reused many times.

Other curing methods include wet earth and sand which are messy and require excessive manpower. Straw and hay are only moderately efficient; they can dry out, blow away or burn.

Test specimens show that poorly cured concrete can easily lose 50 per cent of its potential strength. **And to ignore curing is the same as removing half the cement from a concrete mix.** It is much more economical to spend a few cents per square yard in proper curing, than to spend many dollars using excessive quantities of cement. And without curing, even high cement-factor concrete can be seriously damaged.

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# ALPHA

PORTLAND CEMENT COMPANY

Alpha Building, Easton, Pa.

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that each set of plans does not have to be a monument for a worker to read; nor does it have to be ink on cloth to be filed under perpetual care in the evergrowing archives.

Basically, we must produce more plans with fewer engineers and at a more rapid rate. In order to do this, unnecessary pre-bid work must be cut to a minimum, and the repetition of details and dimensions should be eliminated.

The current plans prepared for the states in the northeast are generally the same and vary only in a few instances. Each state has some feature which seems to be better than its neighbor's, at least to us, but to get the neighbor to accept that detail is like trying to sell someone a Falcon who is sold on a Corvair. You just don't do it too much. I know from my own personal experience that I liked my own detail or my own procedure best—it's called pride of authorship. I think that in dealing with all the states, as I have, that I have gotten over this thinking somewhat.

Some people like studs on beams; others swear by spirals. Some can see that cable guard rail is excellent in absorbing the energy of a crash, and others prefer the plate-type for appearance. Are any of these wrong? Of course not. I'm going to stress standards in this paper, but will not try to give the impression that these standards should or will be accepted by both Maine and California.

Uniformity between the states is immaterial except at the state line. The only ones confused at the difference between states are the consultants, and that is part of their condition of employment.

I would like to discuss a few things about the present plans in the various states in the northeast that I believe are good and should be considered in other states. My comments are not criticisms, but are suggestions for the simplification of preliminary plans.

#### More Standard Sheets

Most states have sheets of standard details which are made a part

of the plans. Vermont has gone one step further, in that they furnish standard sheets for both highways and bridges, and have included many designs such as those for composite beams, approach slabs, bridge fences, standard this and standard that, all of which are referred to in the contract plans. The results are simpler bridge plans, uncluttered with endless details and produced with a considerable saving of manpower and effort and money. Should we continually design beams and slabs and piers and abutments for every simple bridge we draw up, if we have a comparable design, or if standards can be made to cover all conditions with reasonable closeness? Should we have to show calculations for a beam 59'-0" long if we have standards for a 60' beam? Should we have to show slab design when we have thousands already designed and which could be covered in standards?

I believe the answer is no, and that most of our designs for simple structures can be standardized.

I can certainly argue that designs selected judiciously from standards would have stresses well within the range of accuracy attained in placing reinforcing steel, for instance; or in the bending of reinforcing steel; or within the range of structural steel stresses with locked-in rolling stresses being neglected; or within the variations in concrete strengths as evidenced by cylinder breaks.

To carry the step further, there is no reason why, if one bridge already designed has a layout nearly identical in spans, widths and design loading to that proposed, that these plans should not be reproduced and used with whatever slight changes that might be necessary.

Also, in the original layout of an intersecting road with the Interstate, or a stream, there is no reason why the angle of skew and perhaps the profile of a bridge already designed could not be held.

Of course, to be effective, the standard details will have to remain inert for a time, at least as long as the time required to prepare the plans.

#### Highway Plans, 100-Scale

New Hampshire accepts 100-scale plans in rural areas, does not require that the pavement edges be shown except at intersections or interchanges. Hence, generally, in straight doing only the base line, toes of slopes, drainage and side lines will be shown on the plans. This makes a lot of sense. If you are going mile after mile through the country, why clutter the plan with information which will not be used by anyone and the inclusion of which merely tends to fill out an otherwise simple plan.

It is my impression that the use of 100-scale plans should be carried much farther than they are, and again I am talking primarily about rural areas, where detail is light. What is more frustrating than to try to piece together an interchange drawn on a 40-scale, when you can show the same thing on a 100-scale. Even in suburban or urban areas, 100 scales could be used to advantage and the detail made less confusing by the coding of all property owners, which could be shown by name in a table on the sheet. Also in the proposed work the location of proposed catch basins, drains, culverts, guard rail, etc., could be shown by code symbols, thereby doing away with the spelling out of the different items with the consequent cluttering of the plan.

New Hampshire also reduces all plans, including bridge plans, to half-scale for advertising. This is excellent, and only requires that care be taken that the original lettering can be reduced and be legible.

I believe that this reduction could advantageously be carried a step further by folding the reduced plans into book form with the specifications and proposal, and by the insertion of letter-size or fold-out sheets of a great number of standards referred to in the plans. The standard details could be drawn full size, if necessary, for clarity on the sheets, or could be reduced similar to the general plans.

The vari-typing of plans leads to uniformity and clarity and speed, and can be done by regular trained operators. On bridge and



Manpower use in the design room is more efficient today in most—but not all—highway agencies.



Laborious lettering is giving away to veritytyped legends for mounting on plan sheets. Inked tracings today are often dispensed with.

road plans, an experienced operator can produce three times as much work per day as a draftsman using lettering guides. On tabular data, such as summary or quantity sheets made part of the plans, the vari-typer operator outproduces guide lettering 10 to 1.

#### Bridge Plans: Why Bar List?

Massachusetts does not require the complete detailing of rein-

forcement in the bridge structure, or the preparation of a reinforcing steel bar list as is required in many other states. This is a great saving in time in the preparation of plans.

For bidding purposes, it is quite unnecessary that all the reinforcing steel be detailed, any more than it is necessary for complete shop drawings to be drawn for structural steel, which, incidentally, no one requires at this time.

Some states, on a pier for in-

stance, require one sheet showing the pier dimensioned and detailed and on a reproduced sheet require complete reinforcing details. I think the plans are perfectly adequate if the one sheet shows the location, number and size of bars required, as well as pier dimensions.

No one can detail steel better than those whose business it is to do just that regularly. So why not take advantage of this procedure in the interest of saving production time and for quick advertising and not completely detail the steel or show bar lists on the contract plans?

Massachusetts also, of course, uses a lump-sum price for structures with allowable variations for foundation changes. Being the sponsor of it, I think that it is a step in the right direction. It does not save time in the preliminary stages as all items must be figured to arrive at a preliminary cost figure. But it does save time in the field in the preparation of estimates and of finals.

Some other states have a lump sum for structural steel, but most have not adopted the lump-sum idea for bridges or other major items.

It is my belief that this system of payment should be explored and extended to reduce greatly the number of incidental items which we now have. There is no reason why at least many minor items could not be lumped in with major ones.

#### Cross Sections—Necessary?

Cross sections are generally plotted on profile transparency paper, except for a few instances where bond paper is still used. These generally show the same information except that some show planimetered quantities, others yardage; some nothing; some drainage, some not; some show trees, poles, etc., others not.

There is, of course, some controversy as to the actual need of sections in the field. Many construction men that I know, while agreeing as to some usefulness of them, feel that with some critical information given to them in tab-

*Continued on page 87*



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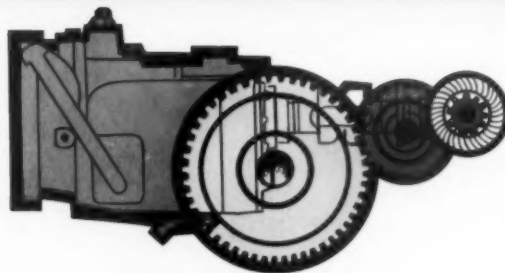
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### New! Independent Apron

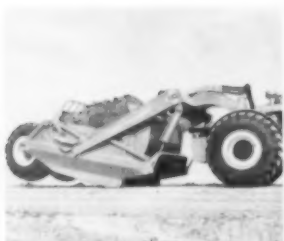
The new TS-360 with independent apron offers faster, more  
controlled loading and spreading under specialized working  
conditions. In loose material you'll get outstanding perform-  
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The new TS-160 now carries 8.5 struck yards . . . 13% more than previous models. The TS-160 is the only machine in its class backed up with "big" motor scraper performance features shown below. The "160" also gives you the widest cutting surface for easier loading, smoother finishing . . . the highest apron opening for fast, clean spreading. See the 155-hp TS-160 today. It'll work alone, or fit right into your largest earth-moving spread.

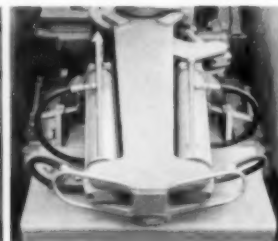
You get **ALL FOUR FULL-POWER EXCLUSIVES** in every Allis-Chalmers motor scraper



**Full-Power Penetration**—enough pressure on the cutting edge to pivot the scraper **and its load** clear of the ground. Only the most powerful hydraulic system could perform the extraordinary feat demonstrated here.



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Select the size that fits your jobs best from the world's only complete line of *Full-Power*, all-hydraulic motor scrapers. From ditching to dam building, there's an Allis-Chalmers motor scraper with the right combination of job-proved features to match any earth-moving situation. Prove it to yourself with a comparative demonstration before you bid your next job.





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**POWER** FOR A GROWING WORLD





## CONTRACT PLANS PREPARATION *Continued from page 82*

ular form, they could be done away with.

The ultimate potential value of the electronic computer in calculating earthwork quantities will not be fully realized, until a tabular substitute for the plotted cross section has been devised and accepted by the highway departments and the construction industry. Once the resistance has been broken down, contractors and engineers find the tabulations to be more convenient to use than the plotted sections. Tabulations can be set up independently for each construction operation, with no scaling required in the field and no extraneous columns to confuse the laborer on the job. Tabulations can be set up listing any required set of conditions such as slope stake layouts. These lists can be extremely useful to the designer, the estimator and the right-of-way engineer, as well as the contractor, and can be made on sep-

arate letter-size sheets or as a separate sheet in the highway plans.

What of the drainage man's problem in calculating his drainage systems? He could obtain elevations of his ditch lines from tabular forms or in complicated cases, if needed, could rough out his own sections.

Until such time as the complete elimination could be reached, sections could be plotted mechanically from the computer on a small scale.

### Permanent Records vs. Microfilm

We should no longer, I think, talk in terms of ink on cloth for permanent records, for contract plans, shop drawings, etc. Thousands upon thousands of drawers in hundreds of file rooms are filled with plans seldom looked at. Thousands upon thousands of

square feet of valuable floor space are taken up here in our public buildings and our private offices in the filing of plans held for possible but infrequent reference.

Acres of space are taken up by the filing of calculations, quantity computations and obsolete correspondence in countless letter files.

Microfilming of all records properly filed and recorded will make this space available for more profitable use. The reproduction of full size prints or tracings made from the microfilming of original tracings or prints are, for all practical purposes, the prints of the original plans, and make it wholly unnecessary to preserve original tracings. It then becomes unnecessary to carry the preparation of plans beyond the pencil on paper stage.

Some strides have been made on the reproduction of pencil-on-paper sheets to a satisfactory substitute for ink-on-cloth. But this phase could be eliminated in the reproduction, if necessary, for the

*Continued on page 90*



## THE STRONG SURVIVE

Every small boy reading a Jack London thriller knows the Law of the Jungle. And in a free competitive society the same basic principle holds true: Only the strong survive.

A contractor's strength is in his organization and in his equipment. And many a drilling contractor depends on Williams earth boring machines to outproduce his competitors.

For drilled and poured in place piling, for drilled and belled caissons, for drilled-in-caisson work Williams units are second to none in productive capacity. Strengthen your organization with Williams diggers.

### WRITE, WIRE or PHONE

for more detailed information available in our Technical Bulletins on each individual model. Direct inquiries to our distributor, factory or this publication.

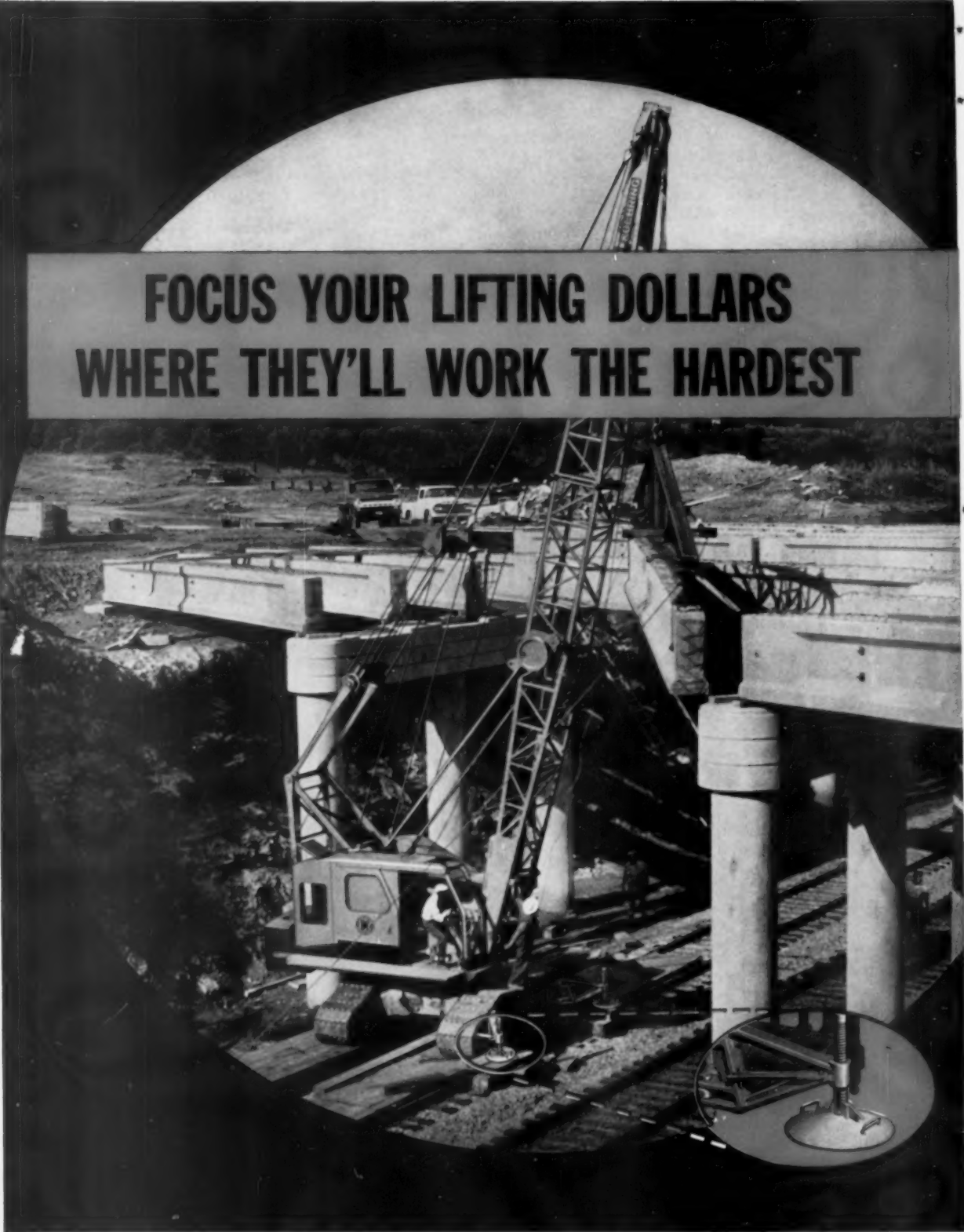
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## FOCUS YOUR LIFTING DOLLARS WHERE THEY'LL WORK THE HARDEST

KOEHRING 545 SPRAWLER, owned by James T. Triplett Inc. of Chester, S. C., eases heavy precast bridge member into place. Machine has pivoting outriggers (see inset) that enables it to outlift its own working weight by 14%. Maximum lifting capacity with outriggers set: 90,000-lbs.



## Look to Koehring

Look over the big Koehring lineup of heavy-duty lifting cranes: crawler, Sprawler, truck and Cruiser models. They're heavy duty through and through, built to outlast and outlift other makes for years and years. Here's why . . .

**BUSINESS END** gives the operator plenty to work with: automatic power boom lowering, power load lowering, pendant boom suspension, boom limit stops, pin-pad boom connection. Makes for faster, safer load lifting and spotting . . . quicker, easier setups.

**MAIN MACHINERY** delivers smooth, direct power flow. Shafts are driven by cut steel gears, rotate freely on anti-friction bearings. Side stands are line bored in place to keep shafts in perfect alignment.

**A MOUNTING FOR EVERY NEED.** Self-cleaning, heavy-duty crawlers and rugged truck and cruiser models to meet job requirements . . . deliver maximum load stability with minimum maintenance.

**SEVEN CRAWLER MODELS**  
FROM 10 to 95-TON CAPACITIES

**TWO SPRAWLERS**  
30 and 45-TON CAPACITIES

**FIVE TRUCK MODELS**  
FROM 18 to 55-TON CAPACITIES

**TWO CRUISER CRANES**  
18 and 25-TON CAPACITIES

See your Koehring distributor . . . or write for a bulletin on the crane of your choice.

**KOEHRING**  
DIVISION OF KOEHRING COMPANY  
Milwaukee 16, Wisconsin

**MORE WORK CAPACITY . . . MORE  
PROFIT PER DOLLAR INVESTED**



Milwaukee Bridge Company's Koehring 305 Truck Crane hoists steel girder for bridge deck. The 305 has a maximum lifting capacity of 25-Tons.



Koehring 605 . . . 36-Ton Crawler . . . pours concrete on Texas Dam project.



Koehring 445 Truck Crane...45-Ton capacity... speeds overpass work on highway job. Ramsour Bros., Castle Rock, Colorado is the contractor.



## **Will Never Owe You Anything!**

Your OWEN Clamshell Bucket starts making money for you from the first hefty mouthful it bites off . . . and keeps on making money because its rugged construction "stands up". It's the bucket with "The Big Bite that's Just Right!"

The OWEN has a strong appetite for work—an appetite that is never satisfied. These are exclusive features that keep it working for you:

**Block and Tackle Type Reeving**      **Recessed Lips**  
**One-piece Head Construction**      **Single Main Shaft**  
**Riveted Bowl Assembly**

Prompt service through ample inventory on new equipment and parts.

Write for OWEN information on how these features can make money for you.



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## **CONTRACT PLANS PREPARATION**

*Continued from page 87*

repetitive use of certain sheets in other contracts.

We are cognizant of the wasted effort of engineers in planimetering cross sections, calculating quantities, in preparing detail sheets, in inking tracings. We recognize that many of our calculations can be made by machine, thereby freeing designers from the drudgery of calculating base lines, profiles, taking areas, earthwork quantities. We know that photogrammetry has completely replaced the time-honored ground survey (or can do so), except for controls and tie-ins, and the conventional plotting.

We know that technicians can and should take over much of the routine work in design and the preparation of plans, but the thing we don't seem to have adequately resolved is the question of simplicity and economy in the preparation of contract plans.

Very few states have made significant changes in the format or contents of their plans since the race started. They have been farsighted and economical in other things, but not in the preparation of contract plans. These are the sacred trust of generation after generation—these are the things that they are used to doing and the things the contractors have gotten used to.

I believe we should no more follow the tedious mode of yesterday in the preparation of plans than that we should outlaw today's modern earth-moving equipment and go back to the old horse-drawn dump cart, and discard photogrammetry work and computer work. Time and men's efforts are awasting, and I think need changing radically.

### **Changes Suggested**

First is the greater use by far of standards and standard sheets, reproduced and inserted with the plans or referred to, as discussed previously. Or, a new approach to the preparation of plans, as is being experimented with in Minnesota (discussed in *Engineering News-Record*, July 14, 1960).

In this system, lettering is typed on tracing paper up to 15 in. wide or on adhesive transparent paper or film. The various sheets of tracing paper are assembled upon a printed border Mylar sheet for processing through a diazo machine. "Originals" are produced from these working sheets. The finished original is clearer and more readable than one with either hand or mechanical lettering, and the time consumed is decreased at least 85 percent. One typist can produce the same amount of work in one day as can ten draftsmen by hand or mechanical lettering. Preprinted standard forms for quantities and special information are filled out on the electric spacing typewriter to replace hand drafted, hand lettered forms. Special notes pertaining to the project are typed on tracing paper. Film transparencies of standard drawings replace re-drafting of individual drawings. Special drawings are drafted, with ink or pencil, on tracing paper of the required size. The forms, notes, transparencies, and special drawings are arranged on a 23" x 36" clear Mylar sheet and attached with transparent tape.

Finally, the assembled sheet is processed in a diazo machine to produce a Mylar or paper transparency original from which are reproduced as many prints as may

be desired. By simplified methods, survey data and topography on tracing cloth prepared in the district field offices or from photogrammetric processes can be mechanically reproduced on plan and profile sheets. As many as 18 plan sheets have been prepared in one day, eliminating weeks of drafting.

A diazo acetate or paper transparency is made from the field or photogrammetric map, then cut into strips and placed on a clear film plan and profile sheet. This sheet is run through the diazo printing machine, together with a sheet of sensitized Mylar. This produces a working plan and a profile sheet. The road design layout and profile are then drawn on the working sheet with a specialized film pencil that does not smear and is easily erased. The plan notes are typewritten and checked as they are applied.

Two alternate procedures can be used, both obviating use of Mylar in the original markup.

A border sheet of paper, transparent or otherwise, can be used as the base; the forms, transparencies, special drawings, notes, etc., pasted on, and an Auto positive print made. This is black-on-white transparent paper in reverse, which can then be printed. Corrections are difficult because it is a photographic process, but it is inexpensive, so that another sheet

can be made if necessary after corrections are made on the original.

The second method would be to produce the base material as above, photograph and then produce a C.B. on which corrections can be made.

Although the Minnesota article emphasized the technique on road plans, it can be equally applied and probably more advantageously to bridge plans, where a separate view can be drawn on smaller sheets with all lettering typed separately, and then arranged on a printed border sheet. By this method, perfect uniformity is achieved.

To carry the simplification further, do we need dimension arrows when a dot will do, do we need to put in the fillet on a beam when two lines intersecting will do, do we need to draw every pole on a thousand feet of fence when an indication will suffice, and as stated before, do we need to spell out all proposed details on road plans when code symbols will do.

All that I have said to you is not new and startling; it has been discussed and rehashed many times; but unfortunately, I think that has generally been the end of it. I think many things need changing, and will be changed. I'd like to see it done quickly so that in the time I have left in this business, I can do more with less.



Directors of the Wisconsin Good Roads Association listen as W. J. Burmeister, director of planning and research, Wisconsin Highway Commission, explains the state's 1960-1970 highway needs. Seated at far left is G. H. Bakke, vice-chairman of the state highway commission. Others present are leaders representing various supporting segments.

## Wisconsin Good Roads Group Offers Plan

"Grass roots" highway promotion is the goal of current activity of the Wisconsin Good Roads Association. This group of interested citizens and organizations has served up a state-wide report of highway needs.

The report, according to association president Lester Palmer, of Mauston, will fuse together data from all reliable sources: the highway commission, legislative study committees, financial experts and highway user groups. The association will support any legislative program which the facts indicate to be sound. One objective is to insure continued modernization of the state's trunk system, which was found 58% deficient for traffic anticipated in the decade ahead.



Overall view of the concrete plant, with Case loader, Koehring mixer and Insley crane in operation. Contractor fashioned his own concrete bucket.

## Specialty Contractor:

# Simple Outfit Handles Five Structure Job

With structures representing a large part of the cost of Interstate highway projects, even "out in the country," new attention is being focussed on methods of getting this part of the work done properly and economically. How structures were handled expeditiously on a Kansas job is covered in these brief notes. The concrete quality was excellent, according to the engineers, and the contractor's setup suggests much thought as to labor-saving and other economies.

The contractor was Welliever





(Top left): Whitman Power Buggy supplying concrete for a wing wall foundation. (Top right): Concreting a structure floor. Workman sitting on the form signals the crane operator where to dump for the concrete bucket.



Case tractor loading hopper facilitated by close-by location of stockpile.

Construction Co., of Topeka, Kansas. The contract covered three rigid-frame concrete bridges and two large multiple-box culverts on a segment of Interstate 70 west of Wakeeney, Kansas. Welliever's contract for \$181,697 covered among other items 3,651 cu. yd. of Class A concrete at \$35.00, 406,820 lb. of reinforcing steel at 12.3 cents, and a normal amount of structure excavation ranging from \$0.90 to \$1.00 per cu. yd.

The contractor had an average of 60 working days per structure,

and his start hinged on notice given by the grading contractor, with a different date for each structure depending on the grading progress.

The Welliever firm's concrete plant centered around a 3-sack Kochring Kwik-Mix Dandie mixer, working from a single stockpile of blended aggregates. With piles located close, a Case 530 tractor-loader directly fed a Uni-Batch hopper, using Winslow scales for accurate measuring and proportioning. A Batchometer on the mixer timed and counted the batches. Mixing

water was truck-hauled in a 1,500 gal. tank truck (F6 Ford with CH& 4200 pump).

Average rate of production with this arrangement was 12 cu. yd. per hour. Concrete was placed with an Insley 15-ton motor crane and a Whitman Power Buggy. A Wyco vibrator was used for all concrete.

Forms were removed when test beams showed a strength of 350 psi, usually attained in about one week. M. O. Welliever was superintendent, assisted by Louis Griffen and Ervin Claycamp as foremen.

**TD-25'S** *Full load, full pass  
ends load-dropping, track-*



# PLANET-POWERED PUSH

## —stopping steering losses

**You Power-steer the International TD-25** by power-shifting either track. Full-time "live" power on both tracks, gives you full-profit production!

You make full-load turns without spillage — because Planet Power-steering eliminates load-spilling, load-limiting "dead-track drag."

With Hi-Lo on-the-go power-shifting, you shift down, to dig hard materials — shift up, to "run" with the load. When push-loading with the "25," you maintain solid contact on straight-away or curve — to speed heaping the bowls and get gear-higher "kick-outs"!

**Exclusive Planet Power-steering makes the TD-25 the industry's only power-shifted 8-speed gear-drive, or 4-speed torque-converter tractor. And only the "25" is powered by the free-breathing, dual-valved 230-hp DT-817 turbocharged International diesel!**

**Compare bulldozing yardage delivered** — time the push-loading advantages of the Planet Power-steered TD-25. Prove to yourself how "live-track" TD-25 push can multiply your "tight-bid" profits. Let your International Construction Equipment Distributor demonstrate!

◆ **Moving thousands of tons of outcrop shot-rock** for mountain road right-of-way, this TD-25 picks up and delivers its full loads without sluing or slipping. Reason: with Planet Power-steering you run one track in high, the other in low speed range to equalize offset loading. And you steer with full power on both tracks full time — to avoid load-dropping interruptions!

**Power-gaining** Planet Power-steering helps you heap-load scrapers in record time — right where clutch-steered pushers lose half their push! Power-shifting either track up or down keeps solid push-block contact on curves. Power-shifting up, on-the-go, gives gear-higher kick-outs than ordinary. And with 7.5 mph reverse, the "25" repositions faster than slower rigs!

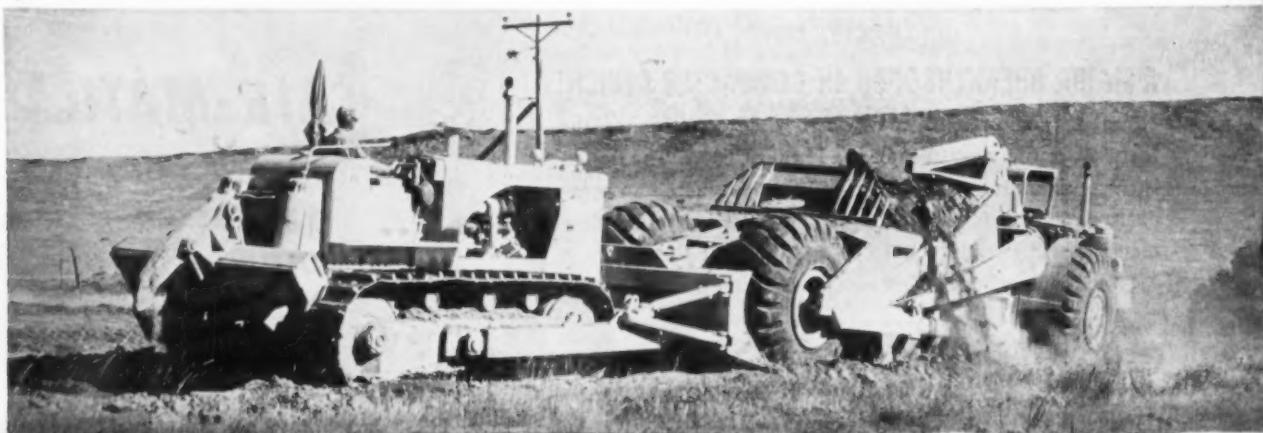


◆ **"Hanging a bench" on a mountainside**, the TD-25 operator either upshifts the bank-side track — or downshifts the outside track. Then he makes full cuts under full power without "bank-nosing," rear-end skidding, or "lever fighting."



**International<sup>®</sup>  
Construction  
Equipment**

International Harvester Co.,  
180 North Michigan Ave., Chicago 1, Ill.  
A COMPLETE POWER PACKAGE







**COMPLETELY**  
***NEW***



**A MAJOR BREAKTHROUGH IN COMPACTER DESIGN!**

No other pneumatic roller can match the performance, the features, or the versatility of the Hyster C500A. The design is the outstanding result of years of basic research on compaction methods for base course and asphaltic concrete. This machine will permit you to profitably meet the toughest specifications being written now . . . or in the future.

**EVERYONE BENEFITS—CONTRACTORS, ENGINEERS AND THE PUBLIC.**

**"AIR-MATIC"**

**GROUND CONTACT**

**PRESSURE**

**CONTROLLED WHILE**

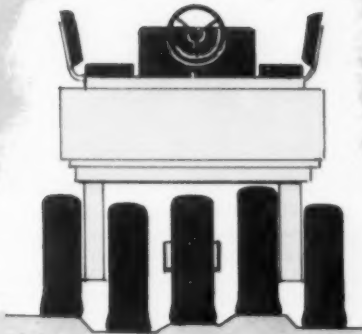
**ROLLING**



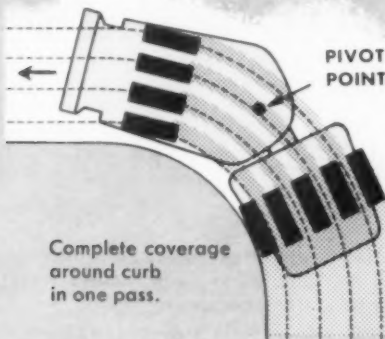


# C500A PNEUMATIC COMPACTER

**Meets the toughest specs...at a profit!**



**VERTICAL OSCILLATION.** All 9 wheels oscillate in vertical plane only—provides uniform compaction and maximum traction—eliminates tire scuff, lengthens tire life—prevents bridging low spots. Total oscillation is 4".



**CENTER POINT STEERING** allows maximum maneuverability (9 ft. inside turning radius) with identical steering in either direction. Maintains constant tire overlap for 100 percent coverage on turns. Automotive type hydraulic power steering.



**HUMAN ENGINEERED OPERATOR COCKPIT** is centrally located and equipped with two adjustable seats and dual controls for maximum visibility from either side. Operator can easily see rolling pattern and curb line. Controls are placed to allow operation from standing or sitting position.

## PLUS THESE IMPORTANT FEATURES:

- All gear drive sealed in oil
- Limited slip differentials
- Pressurized water spray
- Individually removable wheels
- One lever controls throttle and power shift forward-reverse
- Remote controlled tire pressure

**HYSTER "AIR-MATIC" TIRE INFLATION SYSTEM GIVES OPERATOR REMOTE CONTROL OF TIRE PRESSURE FROM COCKPIT AT ANY SETTING FROM 35 TO 150 PSI**

**THE ROLLER THAT BUILDS BETTER ROADS AT LOWEST COST—**

**HYSTER has it!**

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Leaders of the 3-day Public Understanding Workshop, held in Washington last month: William Froehlich, deputy highway commissioner and chairman of AASHO's committee on public information, with John J. Hassett, director of information for BHIF.



At the BHIF Workshop, the effectiveness of constructive press relations was described by Gerald Graves, executive secretary of the Michigan Good Roads Foundation. Mr. Graves has carried on an active and successful campaign for good roads in Michigan for many years.

## National Highway Week Mapped

### Special to Roads and Streets

Some of the best public relations "brains" of the roadbuilding industry gathered with their counterparts in the state highway departments last month, to push the "better highways" campaign onto a new high of promotional activity.

The occasion: A three-day "shirt-sleeves" workshop which brought together in Washington, D.C., the public information directors of 28 states, 19 officials from state "good roads" associations, and 27 PR directors of other highway industry organizations, representing contractors, equipment manufacturers, and materials suppliers.

Their common goal: To mount in one cooperative drive a promotional campaign to rebuild public confidence in the National Highway Program.

The immediate objective: To launch the nation's first "National

Highway Week" this spring (May 21-27), using it as a springboard in an attempt to put highways back in the headlines, in stories more complimentary, for a change, than critical.

The three-day powwow was a round of "shirt-sleeves" workshops interspersed with talks from national highway leaders who frankly admitted that the future of the federal roadbuilding program and those in many states will depend this spring on a complete rebuilding of public support. It is generally conceded, they said, that the "bad press" the highway engineering fraternity and the industry have been receiving in recent years is due to a dismal lack of public relations. Only a few days before the workshop, a national newsmagazine with a circulation of 1½ million carried a harsh indictment of the

highway program, once proudly hailed as "The Grand Plan", and the statement:

"Graft and corruption follow every mile of the Interstate System."

The Public Understanding Workshop, co-sponsored by the American Association of State Highway Officials and the Better Highways Information Foundation, last month was not only a step to assure close cooperation in the new good roads campaign, but was also a recognition that the place to start is with the talent already "in the family."

"In some states, the state highway department public information director is working almost single-handedly to publicize local highway needs and benefits, frequently without adequate staff and budget. In other states, the only



The high cost of inadequate roads: John Gibbons, director of Public Relations, Automotive Safety Foundation, told the Workshop delegates that traffic accidents if continued at the present rate will cost \$77½ billion in economic losses in a decade.

## At Workshop Meeting

non-political spokesman for "better highways" is a dedicated "good roads" association, John J. Hassett, Director of Information for BHIF, told *Roads and Streets*.

"The objective of the workshop was to bring these men together, give them the immediate encouragement that comes from association with their professional colleagues from other states, and give them an opportunity to learn from each other."

The PR specialists waded into a host of professional public relations problems, such as:

How to stage a press tour.

How to handle "hatchet" attacks by the press.

How to produce motion pictures and slide films on highway needs.

How to squeeze the most good-will out of a hearing.

How to develop radio-television

program material.

In round-table discussions marked by candor and free-swinging criticism, the public relations specialists debated the pros and cons of annual reports, press conferences, and each other's departmental literature.

A recent survey of expenditures by state highway departments revealed that only \$1 of each \$129 earmarked for administration is invested in public information. Or for comparison with what private industry spends on promotion of its products, the state highway departments put only \$1 in each \$3,666 of disbursements (comparable to sales to inform the public of highway needs and benefits.

"Everywhere we hear agreement that this is our Number One problem. The time has come to put as much money, manpower and effort

into its solution as it demands," BHIF President Ellis L. Armstrong asserted.

Workshop participants hammered out some concrete plans for making the most out of the up-coming "National Highway Week." Highway department public information specialists reported plans under way for a host of projects, including press tours, "open house" in district offices, exhibits, special speaking engagements by top officials before civic groups, and stepped up press and television coverage of highway projects.

Mr. Hassett, speaking for the industry-sponsored Foundation effort, announced that efforts are being made to obtain an official proclamation from President Kennedy, Congressional resolutions, and statements from other Administration leaders describing the merits of the National Highway Program and the importance of highways to the nation's economy, social and cultural life. In addition, he said, BHIF is producing special promotional kits for use of state groups, and feature stories, editorial cartoons, and news material for the press; staging a national news event, and distributing a brand-new color motion picture which depicts highway benefits to commuters and industrialists.

A New York public relations agency is being retained to develop radio-television program material for programming during that week.

William Froehlich, Deputy Secretary of the Pennsylvania Department of Highways and Chairman of the AASHO Public Information Committee, told the PR specialists that only state-by-state celebrations, sponsored by highway departments and local industry, would be truly effective, however.

"The future of the highway program is in your hands just now. I firmly believe this," he said.

"The engineers can develop the plans, the contractors and materials suppliers can handle the construction job. Whether the industry is given another opportunity to continue the roadbuilding program we need depends now on public understanding of the financing problem.

"Highway Week is our golden opportunity to spotlight some of the good things inherent in the roadbuilding program."

**H**ERE'S how to win road stabilization bids—even with a dull pencil! Wishful thinking? No. You can do it with four machines and a method that's catching on fast. Start with an A-M Spreader to lay the stabilizing additive in a flat, precise ribbon. In most cases you needn't haul in borrow to mix with it. Scarified, native soil will do. Next you add water and blend the material with the rotary Pulvi-Mixer. A few passes with this machine will literally homogenize it. Then you bring it to maximum density with the Ampac-4 pneumatic compactor. Finally you put the Amrol to work—the steel wheel with just the right finishing touch. All done—and you have saved hundreds, maybe thousands, of dollars per mile of new road. The method has been proved; so have the roads—and this is just the beginning! If you want to see the evidence, call your A-M distributor, or write us. American-Marietta Company, Construction Equipment Division, Milwaukee 1, Wisconsin.



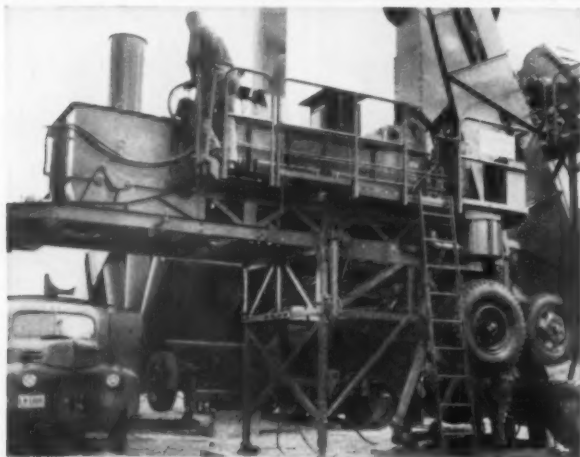
**AMERICAN-MARIETTA**

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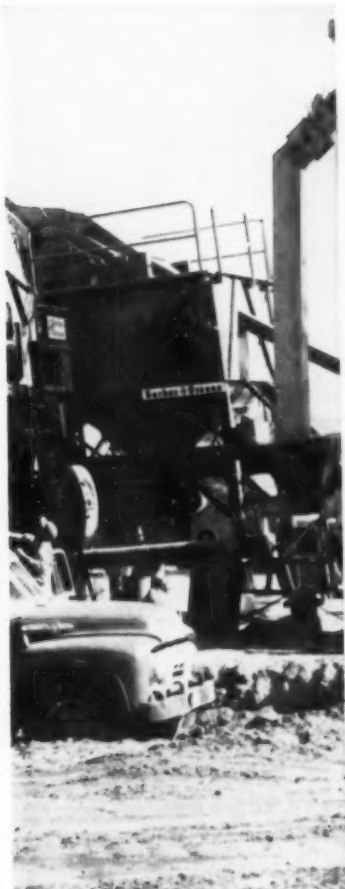
# BEATS TOUGH DEADLINE WITH JOB-TO-JOB MOVES



**HIGH CAPACITY** of Leone's 848-A plant permitted supplying hot mix for two separate projects simultaneously. Domenic Leone's experience with Barber-Greene continuous type plants is best summed up by the maintenance record—over 700,000 tons of mix produced at a maintenance cost of 2¢ per ton. Plant is shown operating near Julesburg, Colorado, one of four locations required on the job.

**UNMATCHED PORTABILITY** of Leone plant permitted teardowns-moves-setups in as little as 11 working hours. Closeup shows wheel mounted units and individual hydraulic jacks with built-in leveling devices on components that cut moving time. Large pugmill, ductwork designed as integral part of plant components plus many other new compact component features all helped increase production and mobility.

# 275 T.P.H. CAPACITY, IN 11 HOURS



**Colorado contractor licks tight schedule on scattered three-project, 64,270-ton contract with 275 t.p.h. average production, speedy teardowns and setups**

To keep pace with multiple scattered jobs being let as single contracts, the Domenic Leone Construction Company, Inc. of Trinidad, Colorado:

- Purchased a new high-tonnage, quick-moving Barber-Greene 848-A Continuous asphalt plant.
- Successfully bid a contract that included three scattered paving projects located within a 50 mile radius.
- Beat the tight \$400,000 contract completion date by two full weeks.

Domenic Leone, a Colorado contractor since 1921, and son John report: "We didn't have enough capacity or portability to handle this type contract with a single plant until we got our new Barber-Greene 848-A. But this 848-A backed up our bid all the way. We averaged 275 tph for the entire total of 64,270 tons mixed and worked both our Barber-Greene finishers on different projects at the same time. And our crew reduced plant teardown-move-setup time to as little as 11 working hours during this three-job contract. That's why we wound up the job two weeks ahead of schedule."

Price Hargrove, plant superintendent, adds: "Getting needed high tonnage was easy with this all-electric, automatic plant with its high tonnage pugmill and king-sized dryer. And this baby was sure designed for fast moves with ductwork being integral with each unit, power integral with each unit, and individual hydraulic jacklegs with built-in leveling devices on plant components."

See your Barber-Greene Distributor for the asphalt plant that backs up those tight bids with high capacity lowest cost production.



**NO. 1 FINISHER LINE** includes: new SA-40 general duty model, shown; 879-B economy general duty model; compact 873; and heavy duty high capacity SA-60 and SB-60 models offering a choice of crawler or rubber tire mounting.

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**ROADS AND STREETS, May, 1961**

*World's No. 1 Manufacturer of Asphalt Paving Equipment*

Representatives in Principal Cities of the World

## Barber-Greene

Main Office and Plant AURORA, ILLINOIS, U. S. A.

Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia



**CONVEYORS • LOADERS • DITCHERS  
ASPHALT PAVING EQUIPMENT**



Rolling of the stabilized aggregate subbase on Thompson-Arthur's North Carolina project was done with a "mixed" roller train, designed for mobility and combining vibration with steel-drum and rubber-tired compaction. The middle unit has circular fins for helping produce a densely packed surface.



Note mosaic or bare-stone finish of the crushed stabilized aggregate subbase, and the inspector walking along with the roller—two points of timely interest on this North Carolina "I" project.



## Bituminous Roads And Streets

Bituminous features appear  
between pages 104 through 118



### In North Carolina: New Emphasis on Base Quality

The asphaltic pavements being placed these days on North Carolina's main arterials represent an upgrading in a number of respects. The subgrade is being prepared to more rigid standards, with proof rolling now routine and weak spots corrected by adding drainage or taking other corrective measures thus found necessary. Testing and inspection are intensified throughout the paving work. And in particular new attention is being given to getting more stable and resistant subbase and base construction.

A project which well illustrates

these advances is the 11.5-mile segment of I-85 completed west of Effland late in 1960. Thompson-Arthur Paving Company, of Greensboro, N. C., was the contractor on the subbase, base and paving for a new two-lane roadway dualizing the existing highway. The experience and good equipment of the 40-year-old Thompson-Arthur organization was also a factor in the good test results reported for the project.

The multi-layered pavement design included the following components:

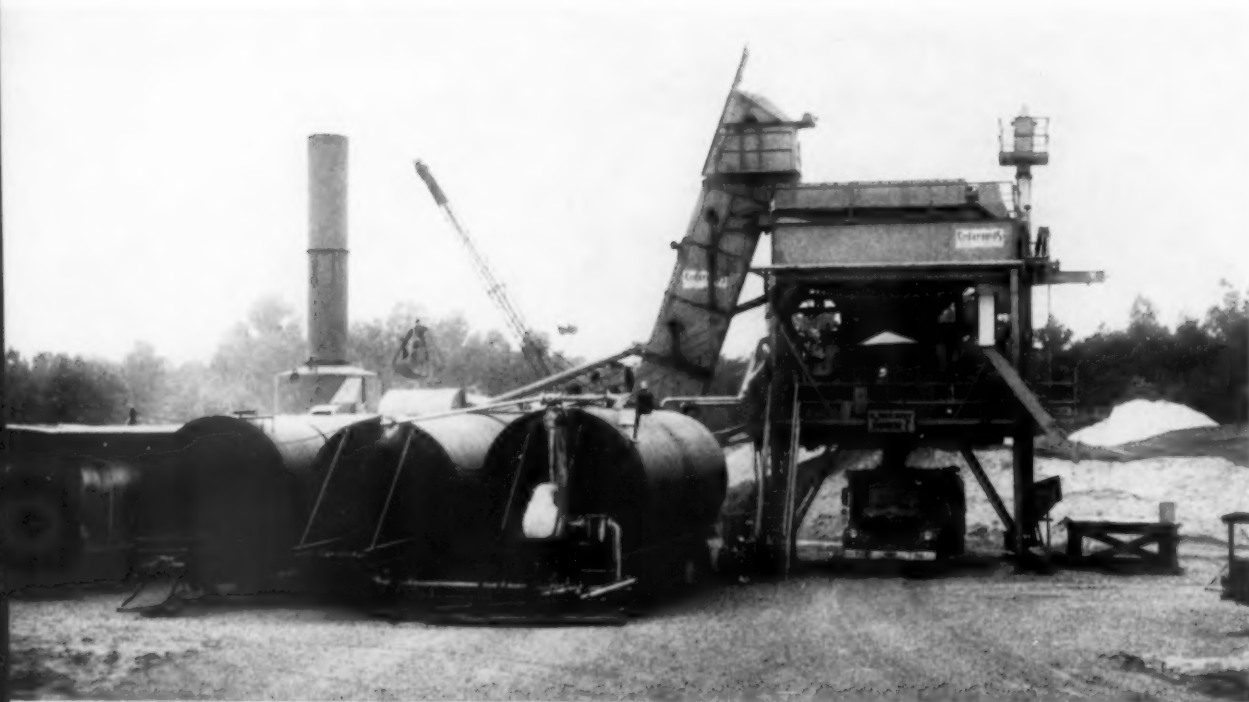
First, the subgrade was completed to 100 percent of standard density and test rolled. (The test rolling was discussed in Roads and Streets, August, 1960.)

Second, a 12-in. subbase of crushed stabilized aggregate was placed in two lifts, and compacted to 100 percent modified density.

Third, a 6-in. black base of hot mixed asphaltic concrete was placed in two equal layers.

And fourth, a 2-in. asphaltic concrete surface was placed. (Text continues on page 110—for pictures of asphalt plant, please turn page.)

## Thompson-Arthur's Asphalt Plant



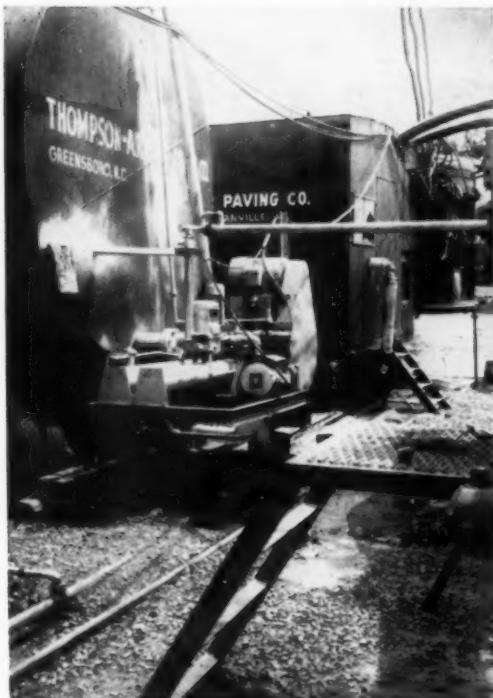
A Cedarapids G60 plant with 7,500-lb. pugmill handled up to 2,000 tons of hot mix per day for Thompson-Arthur Paving Company. Note three 20,000-gal. trailer-mounted tanks, two for asphalt and one for fuel.



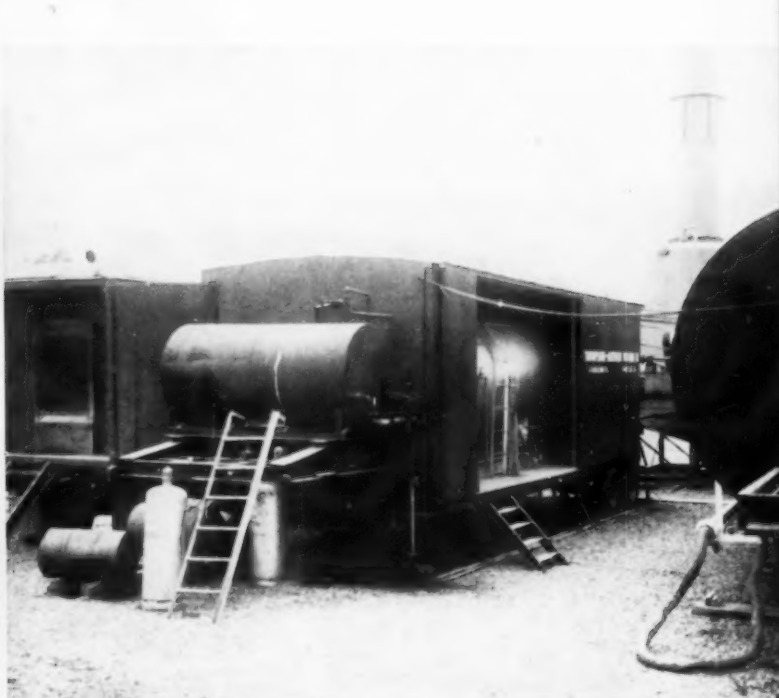
A Cedarapids proportioning cold feed unit with four bins, fed by a Koehring crane.

## for North Carolina I-85 Project

*Text  
continued  
on page 110*



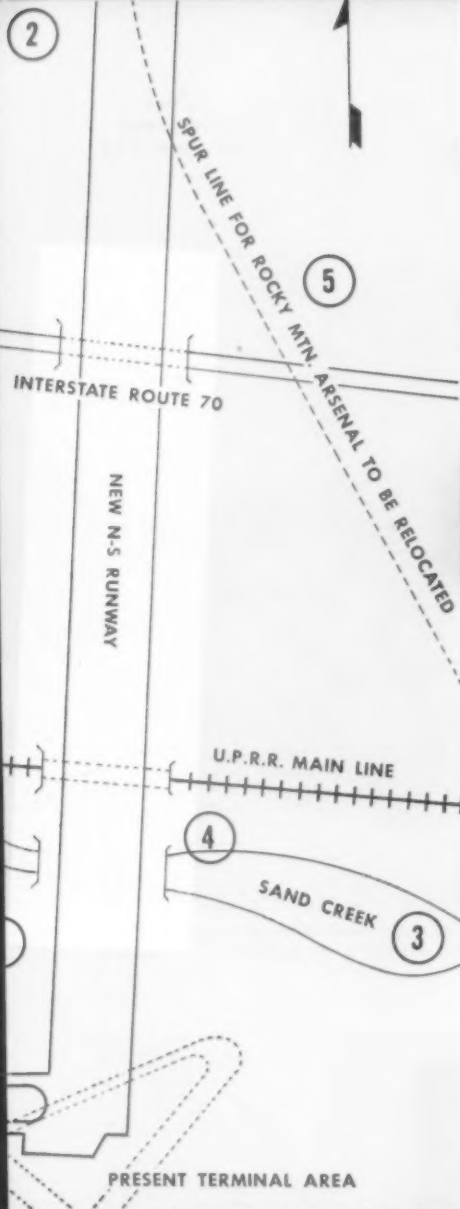
Showing compact arrangement of pumps and piping on end of asphalt storage tank trailer chassis—designed to aid over-the-road moves as well as for keeping the equipment up out of the dirt.



One trailer houses the steam plant for asphalt heating; the other, two Cat D337 diesel generator sets for powering the all-electric, automatic asphalt plant.



Inside the bus which Thompson-Arthur Paving Company provided at the plant to house the field laboratory. Data sheets on clipboards are festooned along the windows for easy reference.



## Northwestern to build

Refer to engineering sketch of project to locate action pictured: (1) Payscraper and TD-25's strip frozen soil from old dump area; (2) Payscraper units with "25" pushers cut drainage channel; (3) TD-25 bulldozer works near creek overpass site; (4) Power Unit pumps from Sand Creek to wet down ashy dump material; (5) Equipment grades near spur track that will be relocated.

Both Payscraper models have 4-speed power-shift torque converter transmissions—of the planetary type. Besides providing smooth shifting and speeds for every need, this torque converter gives automatic lock-up for direct, load-speeding mechanical drive in 2nd, 3rd, and 4th gears. "Northwestern's" Payscraper operators also increase production with rack-and-pinion power steering; positive air-braking; fast, complete power bowl-control.

2





With 835 turbocharged, power-shifted Diesel hp "harnessed"—375 in the International Payscraper,® 230 in each TD-25 pusher—"Northwestern" heap-loads the big bowls with 34 cu. yd. in record time. The contractor highballs dirt on the big jet runway job with four 3-axle "495's," and three 2-axle "295's."



## Engineering Co. uses 100% IH fleet new jet runway

Northwestern Engineering Company will span Union Pacific main line tracks—Interstate Highway No. 70—and a rambunctious creek—to build the north-south jet runway at Denver's Stapleton airport.

To do this huge job, the contractor must make a fill as high as 30 feet—to be carried on reinforced concrete structures over railroad, superhighway, and creek. Moreover, he must relocate a railroad spur, and also replace the ash-like debris of an old city dump with solid fill material.

Northwestern's schedule calls for moving 4,123,000 cu yd of earth and completing the project in 400 days. And this 2.1 mile runway, that will handle the biggest and fastest jet aircraft, is being built from start to finish with International Construction Equipment.

**Prove the powerful performance reasons** behind this up-and-coming contractor's equipment choice. Let your International Construction Equipment Distributor demonstrate!

This International 450 power unit is pumping water from Sand Creek through a sprinkler system—for wetting down old city dump debris, so the scrapers can load and remove this loose, dusty material from runway site.

"Chuck" Loser, Project Superintendent for "Northwestern," stands on spur railroad section which will be relocated in building the jet runway. In background, a 295 Payscraper and TD-25 tractor are at work on the \$1,895,000 contract.

Six International TD-25's give "Northwestern" the bonus dozing and pushing capacity insured by Planet Power-steering, and Hi-Lo on-the-go power-shifting. Full-time "live" power on both tracks helps doze full blades, every pass. And torque converter "25's" speed up all four steps of the push-loading cycle.



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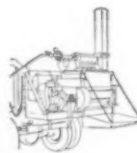
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½ ton per batch



HTD MIXER No. 8  
½ ton per batch



HTD MIXER No. 5  
¼ ton per batch



HTD MIXER No. 4-T  
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**NORTH CAROLINA JOB**

*Continued from page 105*

crete surface was constructed, also in two equal courses.

These notes will give particular attention to the subbase, which represents some new thinking on the part of North Carolina highway department engineers. The material was required to be centrally mixed and placed in a manner assuring a high degree of uniformity. And the surface of the top lift was left with a "mosaic" finish, of which more will be said.

The subbase material consisted of a blend of crushed granite and of sandy soil under a gradation specification here tabulated. The 1½ in. maximum material was designed to combine high quality and adaptability to good compaction. A total of 340,000 tons of blended material was produced in an Eagle stabilizing mixer, located alongside stockpiles at the project's crushing plant.

The stabilized material was placed with a Jersey spreader using an International TD20 tractor, manipulated by a Cat 12 motor grader, and rolled chiefly with a combination roller train. This train, here pictured, consisted of a Case 600 diesel tractor towing an Essick 5-ton vibrating steel roller, a 1,900-lb. steel drum with circular fins, and a Bros 13-tired 12-ton pneumatic roller. This assembly had the advantage of being able to maneuver freely, turn on short radius, and leave a well kneaded surface in conjunction with blading.

Then came the "mosaic" finishing operation. This term is used in North Carolina to describe the pattern of coarse aggregate left exposed by power brooming and sprinkler flushing. The bare-stone finish, the North Carolina engineers believe, serve the vitally important purpose of eliminating the thin mulch of dust that otherwise might lie as a moisture-trap beneath the pavement. This moisture has been found by North Carolina's research engineers to exist throughout a large part of the year. It causes the pavement to sweat. And in winter it freezes, contributing to disruption of the pavement.

...for more details circle 325 on enclosed return postal card



Stabilizer mixer (Eagle) used on the Thompson-Arthur project. Two aggregates were combined with proper moisture in a high-speed delivery and placement operation.

The mosaic finish was adopted following recommendations made to the state's engineers and contractors by a representative of the National Crushed Stone Association.

The rolling of both subbase courses was accompanied by necessary sprinkling to maintain the moisture. The total moisture content in the stabilized aggregate, in accordance with North Carolina's standard specifications, had to be kept between 5 and 9 percent by weight during the construction. The specifications also made mechanical spreading mandatory, as a means of avoiding segregation. Stringlining was required for accurate edging.

In further compliance with the state's standard specifications, the material was immediately and con-

tinually machined with motor graders, maintaining the required section until it had been thoroughly compacted to at least 100 percent of density as determined by AASHA test T99-57, as modified by the corps of engineers of the U. S. Army, using the 6-in. CBR mold and 56 foot-pounds of energy, per cubic foot of material. In place density determinations of the subbase were made in accordance with the AASHO T180-57 method of test. As to rolling methods, the specifications said, "with steel ring and tamping rollers and with pneumatic tired rollers satisfactory to the engineer." Special rollers weighing over 10 tons require written approval of the engineer for compacting stabilized aggregate courses.

The completed subbase, to continue quoting the Book . . . "shall

be smooth, hard, dense, unyielding and well bonded." A broom drag with at least four transverse rows of brooms is required during the top conditioning.

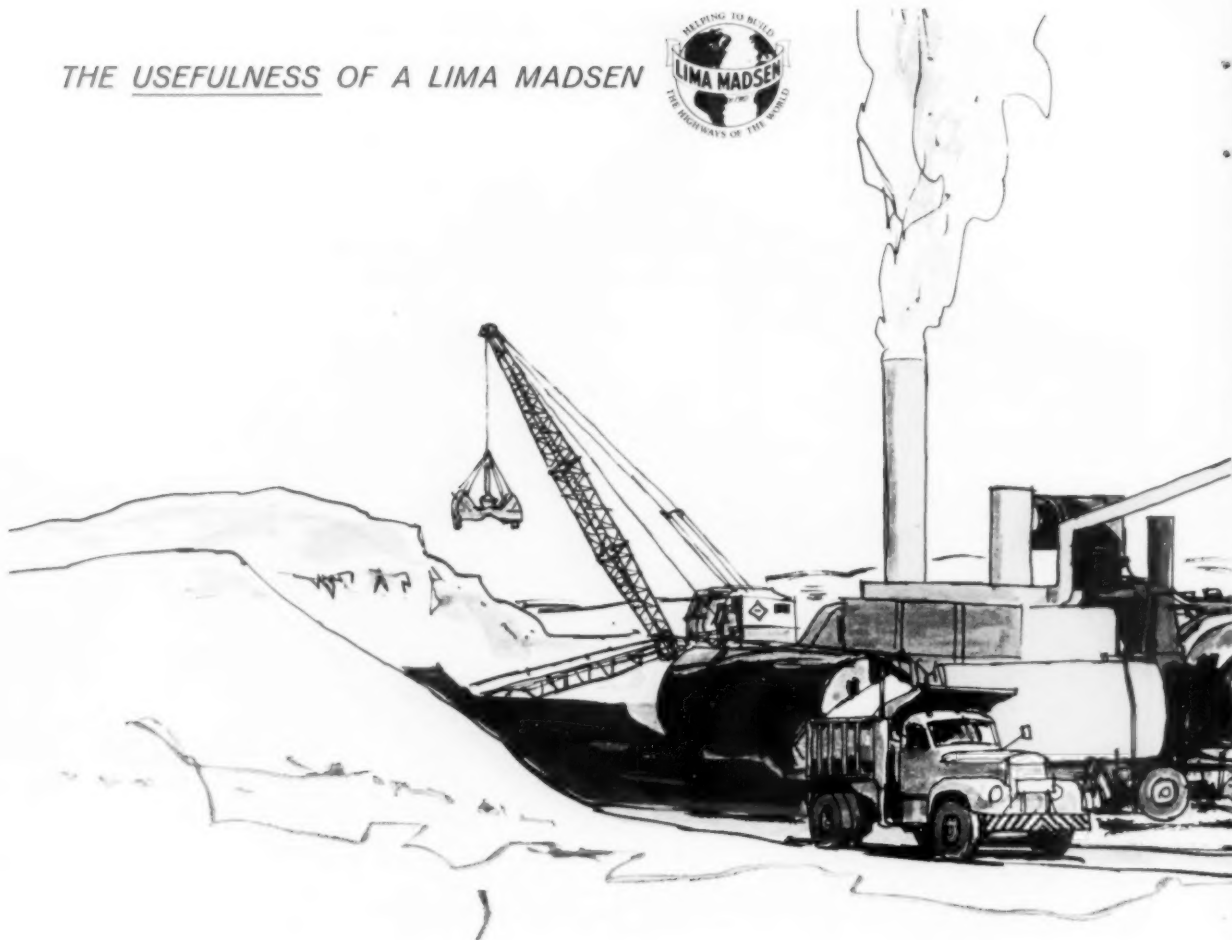
After the first 6-in. course was completed to full shoulder-to-shoulder width, it was lightly tack-coated using .04 to .048 gal. per sq. yd. of heated 85-100 asphalt (the grade used in the hot mix). As soon as possible the spreader followed and the second 6 in. lift was completed.

Samples taken from the completed work must show, for the minus No. 40 fraction, a Plasticity Index not exceeding 6 and a Liquid Limit not exceeding 25.

This is the general specification background for the subbase part of

*Continued on page 114*

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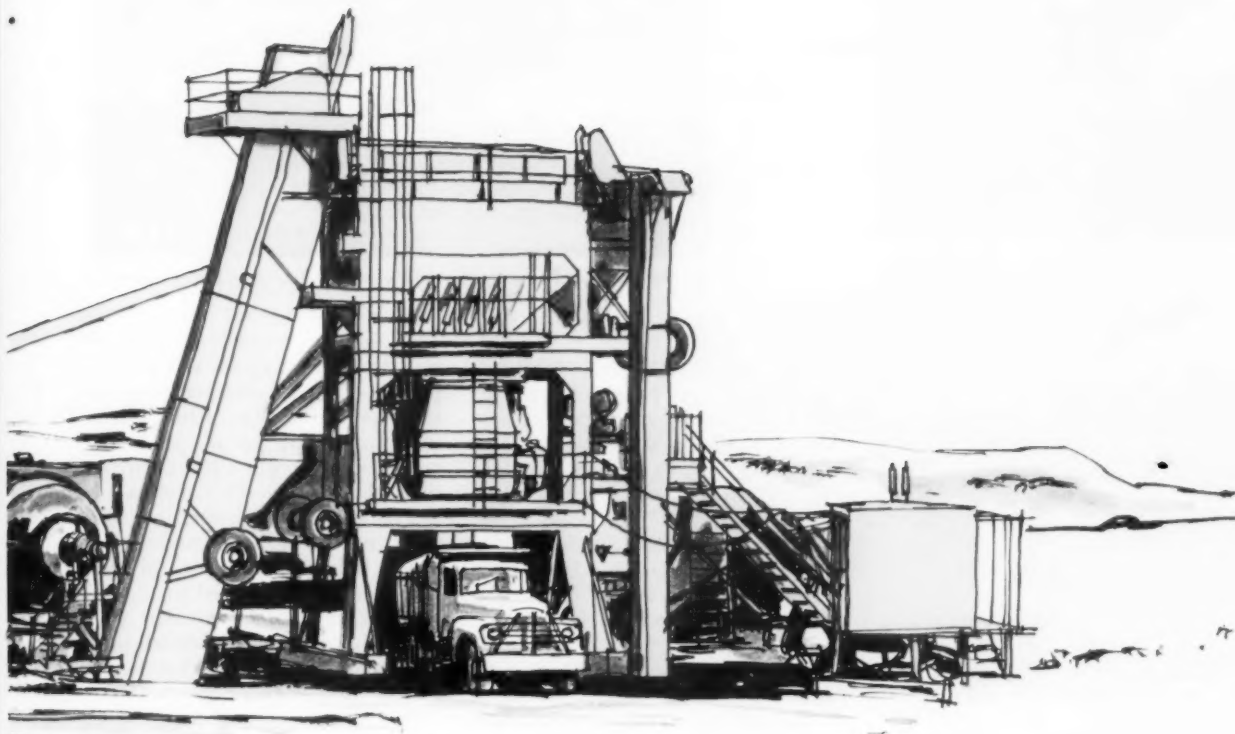
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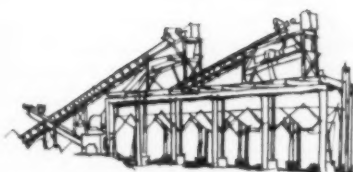
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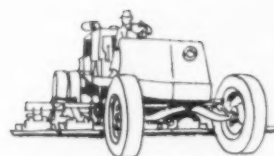




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**ROADS AND STREETS, May, 1961**



Close-up of the mosaic subbase finish, showing the cleanly swept, tightly compacted stone configuration sought for the surface.



Placing stabilized aggregate subbase material with a Jersey spreader and International TD20 tractor.

## NORTH CAROLINA JOB

*Continued from page 111*

the I-85 project here discussed, the mosaic finish being a new development adopted in 1959 and 1960 for projects such as Thompson-Arthur's.

Immediately following final completion the mosaic surface was given a protective coat of .26 to .28 gal. per sq. yd. of RCO. An Etnyre 1,600-gal. distributor handled this and other liquid applications in the job.

The black base consisting of two 3-in. layers of hot mixed asphalt concrete was placed routinely using a Barber-Greene and a Cedarapids bituminous paver, a Galion Roll-O-Matic 3-wheel steel roller, a Bros self-propelled 22-ton rubber-tired roller, a Buffalo-Springfield tandem roller, the latter for finish rolling. The same equipment also placed the surface courses.

The 79,000 tons of base mix and 24,000 tons of surface course mix in the job were produced in a fully automatic Cedarapids 7,500-lb. batch plant, G60. Plant components included two trailer-mounted 20,000-gal. storage tanks for the 85-100 asphalt Kewanee boiler steam heat. A four-compartment cold bin unit with proportioning feeder was fed by a Koehring 405 (1-yd.) clamshell crane. A wet-type washer was considered an important plant element, even in this rural location, as a means of avoiding dust damage to farm crops and to help keep the plant clean and minimize mechanical maintenance.

The all-electric plant was powered by two 150-kw Caterpillar D337 diesel generator sets.

It is noteworthy perhaps that this

was the sixth setup for this asphalt plant in its third summer of operation for Thompson-Arthur. This underscores the importance attached to the portability feature of such plants in North Carolina.

The testing and inspection routine on the project reflected the state's tightened controls. Sixteen inspectors were assigned to the entire job, double the number that would have been considered sufficient not too long back. As an example of the closer watch on details, an inspector was required to walk along with the rollers and keep his eye on the point of contact during all critical phases of rolling, to make sure that specifications were being met.

The contractor furnished, as part of his bid, a complete field material laboratory equipped with a specified list of testing equipment (based on Marshall and Hubbard Field procedures). An old bus was set alongside the plant for this purpose, being located near the haul road for convenience.

The incorporation of a hot-mix black base is a recent development in North Carolina. It followed a study of experience in other states with such base construction. Virginia's experience, in particular, is credited with influencing the decision to use this type of base where feasible on heavily traveled routes, as an economic part of the overall flexible pavement design.

Acknowledgment: the Eagle pug-mill used for this project was part of an aggregate plant owned by Superior Stone Co., Division of American-Marietta.

B. G. Team was general superintendent on the I-85 job for

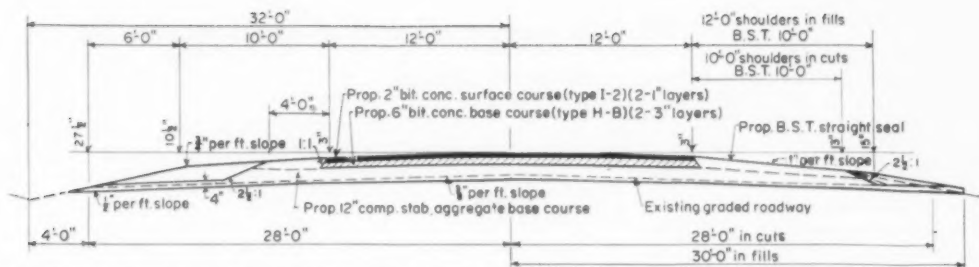


Tack coating of subbase and base layers, and shoulder treatment, were performed with an Etnyre 1,600-gal. truck-mounted distributor designed for maneuverability.



Additional views of Thompson-Arthur's all-in-one Case drawn roller train, showing ability to turn sharply.





Standard cross-section of the multi-layered flexible bituminous pavement design for North Carolina Interstate 85.

Thompson-Arthur Paving Company. J. B. Clifton served as resident engineer for the North Carolina state highway commission, under division 7, T. A. Burton, division engineer.

#### Gradation for North Carolina's Stabilized Aggregate Base Material

(used for the two-course subbase on the Thompson-Arthur project)

Sieve Designation	Percentage by Weight Passing
1 1/2-inch	100
1-inch	80-95
1/2-inch	60-75
No. 4	40-55
No. 10	28-43
No. 40	15-27
No. 200	5-12

The material passing the No. 200 sieve shall be not more than two thirds the percentage passing the No. 40 sieve.

The minus No. 10 material: 40-75 percent pass No. 40, and 12-35 percent pass No. 200.

#### Bituminous Base Course Specification

I-85 project, North Carolina

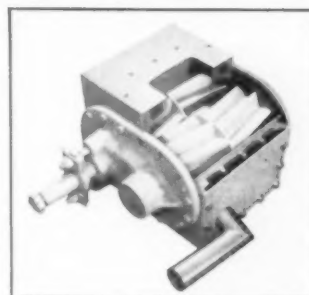
**Stability:** No minimum stability required to the total asphalt-aggregate combination. But minus 10 material intended for combining with the coarse aggregate, including added mineral filler, was required to have a stability value of not less than 800 lb. as determined by the state laboratory using the 2-in. Hubbard-Field method of test. (The minus 10 fraction of the coarse aggregate not included in this test.) Any percentage of required mineral filler used in the sand portion to be reduced on a pro rata basis when computing the per-



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centage for the total aggregate combination.

*Mineral Filler:* At least one-half the minus 10 fraction passing the No. 200 sieve was required to be mineral filler.

*Gradation:* Crusher run material was not permitted, but graded coarse and fine aggregates was required to be blended to produce an acceptable job mix formula. Coarse aggregate was furnished in two sizes to minimize segregation in handling, and the sizes proportioned for the cold feeder of the hot-mix plant.

The gradation limits for the black base mixture called for a 2 in. maximum stone 90-100 percent passing  $1\frac{1}{2}$  in., 65-80 percent passing  $\frac{3}{4}$  in., 30-45 percent passing No. 4, 20-35 percent passing No. 10, 0-5 percent passing No. 200, with bitumen 3-6 percent.

### **Asphalt Institute Plans More Seminar Programs**

A feature of the Asphalt Institute's educational work, its summer asphalt seminar program, will be re-instated in 1962 on a continuing basis. M. O. Huntress, Oklahoma City, chairman of the Institute's committee on educational aids, said the original five-year pilot program which ended with the 1960 summer session at the University of Minnesota has proved so popular with the co-sponsoring schools and student-professors that it will be established on a permanent basis. There will be no session in 1961, however, because plans were not advanced early enough.

The six-week courses for engineering professors and instructors was introduced in 1956. Co-sponsoring engineering schools have included Purdue, University of California, Texas A&M, Cornell and the University of Minnesota. Each seminar has been limited to 16 to 20 selected college engineering teachers, who received grants-in-aid through The Asphalt Institute and the American Petroleum Institute. Present plans are for re-establishment with The Asphalt Institute assuming the full support.

## **Views and Comments**

By H. G. Nevitt

### **Technical Considerations Call For Multilayered Road Structures**

**I**n the preceding review we discussed the stress patterns existing in a road structure, showing that these varied primarily with depth. The resisting layers must have properties meeting these requirements. A further need is obviously that these resistances must not change adversely with time. This means that the tensile strength must not be lost due to oxidation of the binder, and neither it nor the shear resistance lost by change in the layer characteristics such as through absorption of moisture by a clay fraction present.

The oxidation problem is best met by holding the voids in the asphalted layers down to the lowest practicable value. It should be noted that this requirement should apply to all the layers containing asphalt—a practice not hitherto usually followed—because air circulation is not stopped, although certainly diminished, in the lower layers when they are covered by a tight pavement course. Oxidation resistance can also be improved by thicker asphalt films, but the usual (and most economical) procedure is to hold the asphalt film thickness above a minimum value and the voids to the lowest practicable level.

The problem of clay has usually been solved in the past by simply not using aggregates which had any appreciable content of deleterious material in the upper layers. Unfortunately this is no longer always feasible, or much lower costs are possible from the use of aggregates

containing some clay. In such case it becomes necessary to stabilize the clay fraction, neutralizing its undesired effects. This can be done by a variety of agents, for each of which pros and cons can be advanced. Where cohesive qualities in the layer are desirable, this stabilization can usually be done through the use of asphalt, frequently containing an additive (but one that has been proven both necessary and suitable for the specific conditions). Probably one of the most notable benefits in future construction will come from the use of a suitably designed but reasonably low cost asphalted course in the lower part of the base—thus providing a waterproofing layer to protect the course above, and adding measurably to its load capacity by augmenting the direct beam action of the structure, yet not requiring aggregate of more than moderate quality due to its position in the structure.

We will sum up the technical requirements of the structure as brought out in this and the preceding discussion. The top layers need maximum shear resistance and tensile strength, usually provided by a densely graded aggregate of suitable quality supplemented by a high strength asphalt binder. At some distance below the top, cohesion becomes less effective and only that readily obtainable should be provided, while the frictional resistance can start to diminish, tapering off gradually to the value



provided by the basement soil. Layers in the moderate or high stress intensity zone may need stabilization against water action; and lower base layers given cohesion in this fashion can be very effective, but where used the layers above must exhibit sufficient shear resistance to develop this lower level beam strength.

An obvious corollary to the above summation of the design situation is this: we need means for more precisely determining the required tensile and shear resistances corresponding to any given set of conditions. The experienced engineer in this field has sufficient idea of the facts to make a satisfactory design meeting the above requirements; but it will be something of an approximation. Less dependence on judgment instead of accurate design calculations would be highly beneficial.

Obviously the economic aspect of the design possibilities will be highly important. The layer properties will be set by the conditions up to a certain point; but beyond minimum requirements for the upper layers a great deal of juggling of the structure makeup, and of layer thickness with corresponding layer properties, is possible. Since the engineer's job is to get minimum cost as well as structural sufficiency, these various possibilities must all be considered in order to find the optimum design. These economic considerations will be the subject of our next (fourth) discussion on multi-layer pavement design.

### Pennsylvania Reports 4,439 Weak Bridges

Of the 21,425 bridges in Pennsylvania's highway system, 4,439 are regarded as "hazardous" by the state department of highways.

In a booklet, "Pennsylvania's Challenge," the department notes that the spans rated as hazardous are those with a capacity of less than 15 tons. All such bridges have been posted for weight or clearance limits. The department has initiated a program to replace half of them within 12 years at a cost of \$150,000,000.

### Rice Heads AAPT

James M. Rice of the Natural Rubber Bureau, Washington, D.C., was elected president of the Association of Asphalt Paving Technologists at the 36th annual meeting of this group held at the Francis Marion Hotel in Charleston, S.C., February 6-8. He succeeds James E. Ward of Barber-Greene Company.

Other new AAPT officers include Frank M. Williams, Ohio Department of Highways, Columbus (1st vice-president); and Ray E. Bollen, Highway Research Board, Washington, D. C., (2nd vice-president). New directors at large are B. A. Vallega, Golden Bear Oil Company, Los Angeles; and J. O. Izatt, Shell Oil Company, New York City.

L. W. Corbett and R. E. Swarbrick of the Esso Research and Engineering Company received the Association's Annual Award for the best paper presented at the previous annual meeting. Their paper was entitled "Composition Analysis Used to Explore Asphalt Hardening." T. L. Speer, Standard Oil

Company (Indiana), won honorable mention for his "Progress Report on Laboratory Traffic Tests of Miniature Bituminous Pavements."

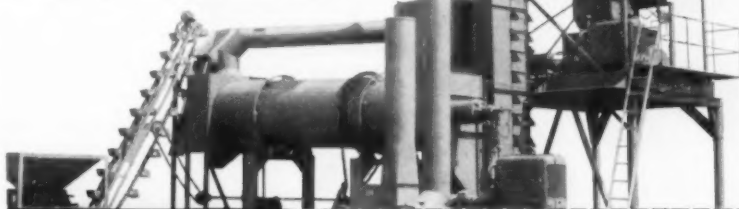
Over 250 members and visitors attended the five technical sessions which included 16 papers on such subjects as fundamentals of asphalts and fillers, viscosity measurements, design and control of paving mixes, plant mixing and drying, flexibility and viscous resistance of pavements, densification under traffic, pavement evaluation, and a panel discussion of "asphalt bound bases."

The Association of Asphalt Paving Technologists, founded in 1926, is devoted to the advancement of asphalt paving technology through encouragement of research and exchange of information. The present membership of over 500 on a world-wide basis includes leading specialists in this and allied fields. The Proceedings of the technical sessions are published annually and those for the 1960 meeting may now be obtained from the Secretary-Treasurer, W. K. Parr, 1224 East Engineering Building, Ann Arbor, Michigan.

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# Cationic Asphalt Emulsions Simply Explained

Asphalt emulsions have been steadily growing in favor and use for the past several years as the technology of manufacture and use continues to improve. There has been a growing awareness of the basic advantages offered by asphalt in an emulsified form; and the most significant of these is simply the use, for production, of an inexpensive and readily available raw material such as water.

Traditionally, asphalt emulsions have been prepared by using crude soaps or clays as the emulsifier. These materials are characterized by ionizing anionically where the long chain containing hydrocarbon or asphalt soluble portion of the molecule is the negative component or anion.

In contrast to the disadvantages

and limited versatility of the anionic asphalt emulsions are the recently developed cationic emulsions. The use of cationic chemicals for the emulsification of asphalt is a relatively new approach, with very little related technology known. However, recent research has served to prove the utility and versatility of cationic amines in this application.

Cationic fatty amines possess an extremely high degree of affinity for metal and mineral surfaces. These amine emulsifiers ionize in solution to give positively charged particles as opposed to the negatively charged anionics. Since most surfaces inherently possess a negative charge, the basic advantage of the cationic emulsion over the anionic type becomes quite apparent. The normal

attraction of unlike charges will, therefore, cause a cationically emulsified asphalt to be strongly deposited on almost any surface.

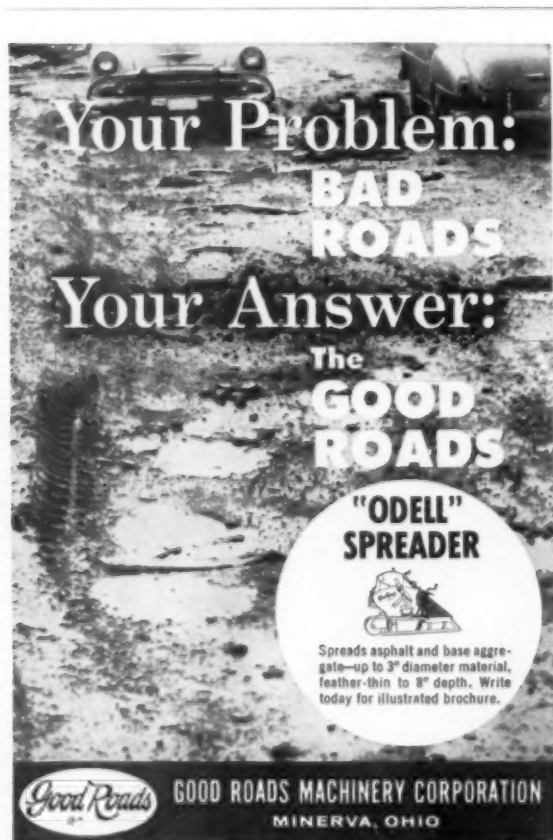
The "break" of a cationic emulsion is primarily a chemical phenomenon which, due to the natural attraction or substantivity of the cationic agent, begins to take place at the moment of contact. Surface and atmospheric conditions have little effect, if any, on the adherent properties of the cationically treated asphalt and the presence of moisture on a surface is no deterrent to adhesion. The strong preferential attraction of the cationic agent actually displaces water from the surface, thereby creating a common chemical bond between it and the asphalt. The bond is such that an anti-stripping effect is obtained.

The paving industry has, in recent years, utilized a sizable amount of oil soluble cationic materials as anti-stripping agents. They are normally added to asphalt cements and cutbacks to promote complete adhesion and retention of the asphalt film on wet and very hydrophilic aggregates. These oil-soluble, cationic, anti-stripping agents, which differ from the water soluble, cationic emulsifiers in the kind of acid used for their neutralization, perform only a single function. The cationic emulsifier, on the other hand, performs the dual function of providing efficient emulsification and effective anti-stripping after asphalt deposition on a surface has occurred.

Many cationic materials exist which are capable of emulsifying a variety of oils, solvents and waxes, however, certain fatty diamines salts and a quarternary ammonium salts have been responsible for the most successful groups of cationic asphalt emulsions.

Perhaps the most striking feature a cationic system possesses is its remarkable ability to coat a surface in the presence of water. Many examples of this phenomenon are in present day use. Pigments, for example, can be coated while in an aqueous slurry, making them hydrophobic and lipophilic. Flushing of an untreated pigment into a cationically treated oil proceeds almost instantaneously. Asphalt road construction can and often does proceed under the most unfavorable weather conditions, which prior to cationic treatment would have been time lost. Theoretically, discounting individual discomfort it is quite possible to continue paving with asphalt-aggregate mixtures in a driving rain.

(As outlined by J. N. Dybalski in *Paint Industry Magazine*)



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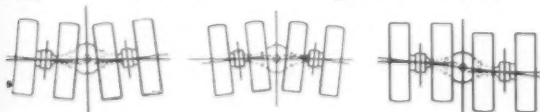
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CONVEX CROWNS

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TWO ELEVATIONS

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☐ MODEL 9S-14 with 3,225 # wheel load ☐ MODEL 7S-35

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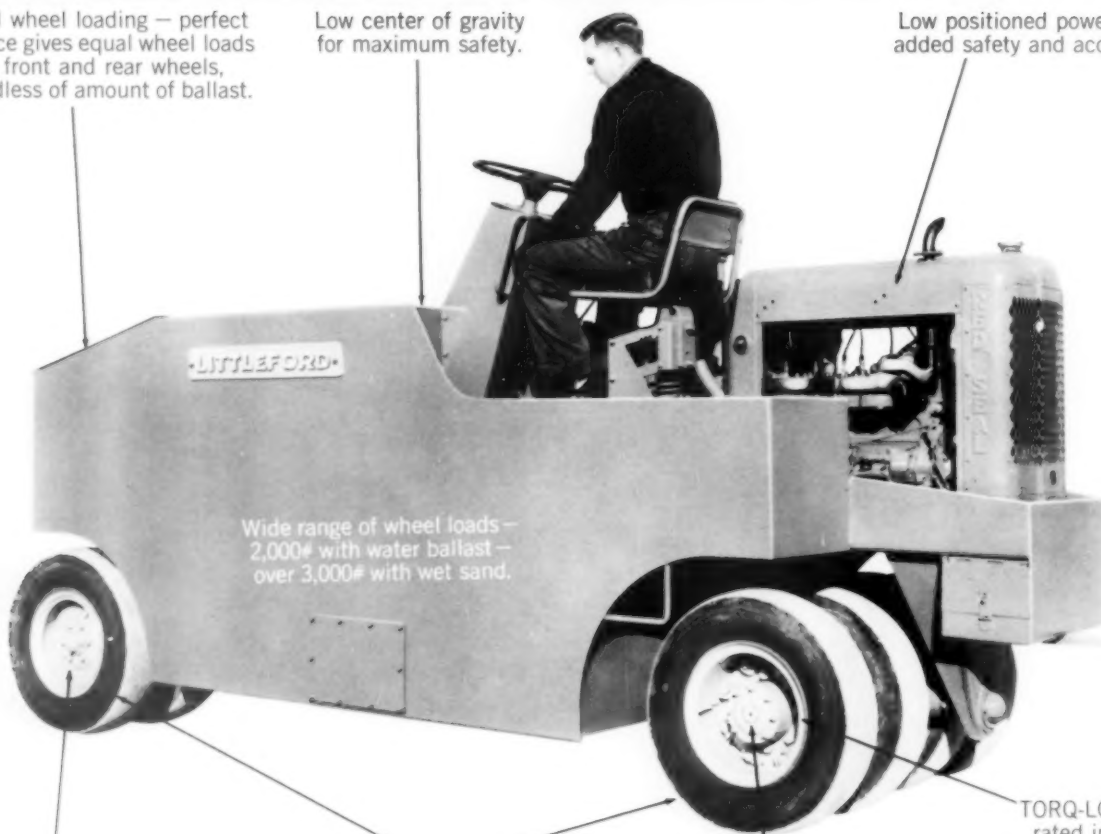
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*Littleford office in Cincinnati, Illinois and Albany, New York*

Equal wheel loading — perfect balance gives equal wheel loads on front and rear wheels, regardless of amount of ballast.

Low center of gravity for maximum safety.

Low positioned power unit for added safety and accessibility.



Wide range of wheel loads — 2,000# with water ballast — over 3,000# with wet sand.

Complete automotive type power steering.

Complete wheel oscillation for equalizing loads and greater traction.

F-80 axle gives independent oscillation assuring maximum traction in heavy lifts.

TORQ-LOK incorporated in rear axle assures full torque to either side . . . gives equal positive traction.

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MEETS PRESENT COMPACTION SPECIFICATIONS AS WELL AS THOSE OF THE FUTURE

With the model 9S-14 each pair of drive wheels has complete ground contact assuring maximum traction and equalized wheel loads regardless of contour. This action is accomplished with the F-80 axle . . . a patented Littleford development which permits the drive axle to flex a full 15° from center and each pair of drive wheels to oscillate an additional 6° without losing ground traction.



### LOW CENTER OF GRAVITY

The location of the engine, axle and differential, combined with perfect balancing of ballast box, gives the Model 9S-14 an extremely low center of gravity.

Permits unit to operate on slopes with minimum danger of tipping.

### TORQ-LOK

One of the features of the rear axle drive which permits either side of drive axle to have full torque regardless of slippage on the opposite side. When wheels on one side begin to slip, the power is maintained on the wheels having traction — assuring maximum maneuverability under the most rugged conditions.

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## THE MODEL 7S-35

THE BIG BROTHER TO THE 9S-14  
*Same features, only bigger . . . much bigger!*



The giant F-130 axle with four huge oscillating drive wheels means much more work in less time—fewer passes through heavier lifts. "Engine over axle" design—lower center of ballasted weight—full powered dual controls—



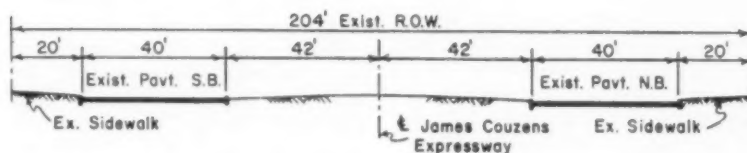
# Rush Job in Detroit: Million-Dollar Temporary Road

The contracting firm that hung up the new speed record for placing concrete road paving last summer (Roads and Streets, October, 1960), was busy at the same time on another rush job—one that is in many respects quite unique.

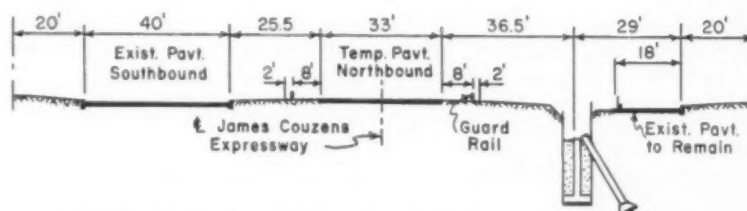
The contractor: Denton Construction Company, of Grosse Pointe Woods, Michigan. The project: 4.5 miles of construction involved in extending the John C. Lodge Freeway in Detroit. The unique feature is that this \$950,000 job was for a heavy-duty pavement 33 ft. wide that would be ripped out within three years, having served merely as stage construction.

The temporary roadway built by Denton lies in an 84-ft. median between two existing 40-ft. roadways now serving along the axis of the new expressway. This existing wide-median dual-road is part of the famous pioneer superhighway system of Wayne County and metropolitan Detroit, dating back 30 to 40 years. The new temporary roadway marks the first of four stages (see sketches) by which the existing parallel one-way roadways at grade will give way to modern 6-lane depressed freeway.

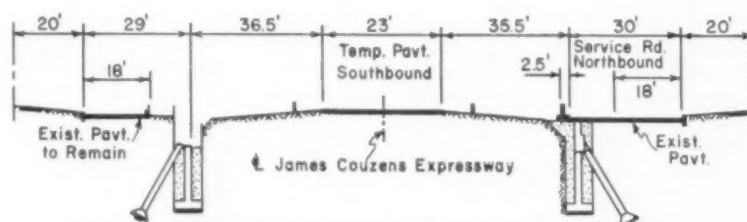
The Michigan state highway engineers knew from experience that any detour or other temporary pavement must be built almost as strongly for a short life as for a long life, if smoothness and safety were to be assured, maintenance kept down, and traffic disturbance avoided. This roadway is expected to carry 50 million vehicles includ-



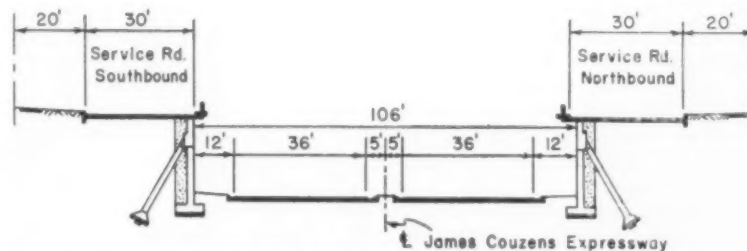
STAGE 1-TYPICAL EXISTING SECTION



STAGE 2-NORTHBOUND SERVICE ROAD & WALL UNDER CONSTRUCTION



STAGE 3-SOUTHBOUND SERVICE ROAD & WALL UNDER CONSTRUCTION



STAGE 4-TYPICAL FINAL SECTION

Four sections showing progress of the construction of the James Couzens Expressway in Detroit. The temporary road is seen in the median in the drawings of stages 2 and 3.

ing many trucks during its short life—which figures out to only a small fraction of a cent per vehicle-mile. A good investment indeed, from a public service standpoint.

The construction involved in Denton's job was not particularly difficult, except that the heavy traffic at cross streets required safety measures and close job scheduling. The work was all done during daylight hours, instead of at night as was first planned, because night traffic was found to be quite heavy. The traffic problem centered chiefly at the many cross streets.

Preliminary work consisted of removal of 100,000 cu. yd. of topsoil and several hundred trees, placement of temporary drainage, and handling of shallow excavation. The paving crew then moved from block to block, with two dual-drum pavers and a standard spreader and finisher. As the paving train arrived at each cross street interruption, a truck crane was waiting to pick up the equipment and swing it to the far side.

The state highway department

made a concession to bidders on this job, letting down the bars somewhat on aggregate requirements as an economy measure. They reasoned that the "worst" concrete aggregate commercially available would produce concrete good enough to last three years. Accordingly a special provision was written permitting a mix with a single crushed coarse aggregate obtainable from local pits. Air entrainment however was required. The 8 in. uniform thickness concrete was laid without reinforcement.

Also with the short service life in mind, concrete and corrugated metal drain pipe and steel guard rail were placed with expectation of later removal and reuse. Street lights and traffic signals at temporary locations were mounted on temporary wood poles, and considerable footages of electrical ducts also were designed for short-term service.

During the progress of the work many mid-block cross-overs were eliminated, and asphalt sidewalks built where required at cross streets.

Despite the traffic maintenance problem, the Denton firm was able to grade and pave the entire job between July 1 and December 1, leaving only minor cleanup work to be done.

The first segment of the permanent expressway was awarded to Darin & Armstrong and the 2nd to Louis Garavaglio Co. The scheme, as here sketched, will consist of the following:

(1) Route northbound traffic over the new temporary road, while the existing northbound roadway is reduced to half-width and retaining wall footings constructed in trench.

(2) Complete the retaining wall and reconstruct the northbound roadway as a service road, while also carrying out stage 2 on the southbound side.

(3) Complete the southbound service road including retaining wall, and excavate for and pave the depressed express roadways.

The project is part of the Michigan state highway department's freeway program for the Detroit area.

## Cooling Systems Ready for Summer?

**T**he cooling system in modern road and construction machinery is not just a tank of liquid coolant. It is a carefully engineered system of narrow thin-walled tubes, rubber hoses, a water pump, thermostat, and the water jacket itself. Damage to any one of the many components can mean breakdown, repair bills and job downtime.

With a rusty or dirty cooling system, engine heat cannot be removed fast enough. Engine temperature rises above the range best for operating efficiency. If there isn't enough coolant, heat will build up rapidly. Rust particles if present will clog radiator ducts. Or rust forms an insulating blanket, keeping engine heat from being picked up by the coolant.

A temperature gauge may not show that your engine is overheating—but somewhere along the line, an inadequately maintained cooling system takes its toll out of your pocket. Engines may begin knock-

ing, or lubrication may be impaired and your vehicle may begin to eat oil. Abnormally high temperatures can burn out valves; damage gaskets, pistons and rings; and even cause bearing failures.

A good way to expedite the check-up is to line up six or eight of your vehicles together for draining and servicing. If your serviceman will place the vehicles in two rows facing each other, he can perform the following eight-step maintenance program with a minimum of time and effort. This approach will cut fuel costs and eliminate many repair and maintenance expenses.

1. Drain worn-out winter anti-freeze. Even ethylene glycol anti-freeze, with its high boiling point gets "worn out" during the winter. Hot weather operation without the anti-freeze's original inhibitor value, means that the cooling system will corrode twice as fast.

2. Flush the cooling system with

plain water. If corrosion, scale or grease are noted, use a chemical cleaner. Back flush the radiator and engine block with water and compressed air if there are signs of rust plugging the radiator tubes.

3. Check thermostat for operation at proper temperatures.

4. Check hoses for deterioration, and replace those which are weak or worn. Tighten hose clamps securely and replace broken ones.

5. Examine fan belts and other drive belts for signs of wear and check them for proper tension.

6. Make sure the radiator pressure cap is free of rust or dirt, and that the rubber gasket and filler neck seat are in good condition. Remove all obstructions—bugs, leaves, paper, dirt, etc.—from radiator air passages.

7. Refill the cooling system with fresh water and add a good rust inhibitor.

8. Run the engine to adjust coolant level, then check thoroughly for leaks at radiator, hoses, water pump and cylinder head gaskets.

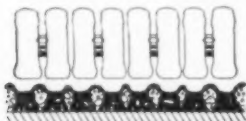
## How two contractors cut compaction fleets in half

**Seaman Duo-Pactors do the work of several single purpose compactors**



When a prominent Midwestern contractor\* won a contract for building a section of Interstate Highway, compaction became one of his most pressing problems. Density specifications of 95% modified AASHO had to be met on 1,000,000 cu yd of fill, and 100% on 21,000 cu yd of granular base. It looked like compaction was going to be a major cost factor.

Interested in holding down costs and increasing scraper productivity, the contractor tried and purchased a Seaman Duo-Pactor. Here was a



The closely spaced tires form densely compacted tracks with minimum material displacement.



Lowering the steel roll chokes ridged material down between the tire tracks, unifying density.

machine that combined the advantages of high-pressure pneumatic tires for deep compaction, with a heavy steel roll to press down the ridges and prevent material displacement, thus assuring uniform density across the entire rolling width.

**Reports the contractor: "Using the Duo-Pactor reduced our compaction equipment requirements from three crawler tractors with sheepfoot rollers to one. This represented a big saving in investment while increasing productivity."**

"We employed the method of thin lifts, using the one sheepfoot when required for pulverization. Usually two high speed passes with the Duo-Pactor gave us the compaction required. This permitted us to keep our production equipment moving at all times.

"The Duo-Pactor served more than one purpose: It handled compaction on the grading operations, placement of surfacing on the approach roads, and compaction of the granular lift under the slab. We were able to compact the sand lift quickly where others were using slow-moving plate-type vibratory equipment."

### Birdsall reports similar savings

The experience related above is paralleled by that of R. R. Birdsall & Sons Company, Racine, Wis. Secretary-Treasurer R. R. Birdsall, III, reports:

"We bought the Duo-Pactor to do rolling and compacting on granular subgrade and subbase on our concrete paving contracts. We get our density easily and quickly, varying our ballast to meet the various subgrade conditions as they are encountered.

"We often have specifications requiring the rolling of the subgrade and granular base lift with both rubber and steel. With the Duo-Pactor, we do this with one operator and one machine rather than two operators and two machines, thus reducing our costs.

"The portability of the Duo-Pactor is also a big factor with us. It can move from job to job under its own power, cutting moving costs, and getting the machine to the place where it is needed quickly."

\*A certified contractor report from Seaman Corporation files

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Tel.: SUNset 1-8900

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|--|---|
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| <input type="checkbox"/> 9-27-ton Duo-Pactor               | <input type="checkbox"/> Self-Propelled Impactor      |
| <input type="checkbox"/> 10-30-ton Self-dumping Duo-Pactor | <input type="checkbox"/> Utility 6-yd Scraper         |
| <input type="checkbox"/> 8-20-ton Tri-Pactor               | <input type="checkbox"/> Bituminous Distributors      |
| <input type="checkbox"/> 10-27-ton Tri-Pactor              | <input type="checkbox"/> Street Flushers              |

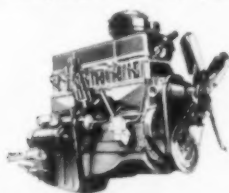
...for more details circle 338 on enclosed return postal card





# HERE'S WHY IT'S A GOOD IDEA TO GET A CHEVY PICKUP:

Because Chevy's wide choice of models (there are 15 of 'em!) means you'll get the *right* pickup . . . because each is engineered to the highest standards . . . because Chevy's rugged, smooth-riding build lasts longer, costs you less to own and keeps your profits at peak levels. Chances are, whatever you consider most important, you'll find Chevrolet has thought of it first, and done most about it. Whether you get a handsome Fleetside or handy Stepside model (or possibly a Corvair 95 Rampside or Loadside or one of a half-dozen four-wheel-drives) you'll soon be convinced that buying a Chevy pickup was the best idea you ever had!



## ECONOMY

The Chevrolet slant on economy makes the most sense of all, with the tight-fisted 235-cubic-inch Thriftmaster 6 (standard) leading the way. It's the most experienced money-saver going, one that's powered more payloads than any other engine in the business. It's famous for its stingy way with a gallon of gas and also for its rock-ribbed durability. It keeps your Chevy at work, making money, instead of in the repair shop, costing. And if you prefer the extra snap of V8 power, there's the eager, efficient Trademaster V8, 160-horsepower strong and available at nominal extra cost in all conventional pickup models.



## CAPACITY

Chevy pickup bodies—6½, 8 or 9 feet long—are tops in cargo capacity and convenience, with a long list of bonus-built features to keep them working better and looking their best from delivery to trade-in. Both Fleetside and Stepside models feature select wood floors for better footing and quieter going, with steel skid strips to ease loading and unloading. Extra strong grain-tight tailgates with anti-rattle latches and support chains minimize bulk cargo leakage and offer firm support for extra-long loads. Fleetside body side-walls are double-walled in the lower section, for extra rigidity and protection of exterior surfaces against dents caused by shifting cargo.



## PROFIT- \*\*\*\*\* PROTECTING RIDE

All of Chevrolet's 2-wheel-drive pickups feature years-ahead Independent Front Suspension design, with ride, roadability and ruggedness that are paying off for truckers everywhere. The reduction in driving effort and fatigue that makes a bigger day's work come easy is just one part of the three-way Chevy payoff. The same shock-cushioning action protects your cargo against damage en route, and also protects the truck itself against the bumps that can batter the life out of cab, body and chassis components. Sounds too good? . . . sample it for yourself at your Chevy dealer's, soon! . . . Chevrolet Division of General Motors, Detroit 2, Mich.

## 1961 CHEVROLET STURDI-BILT TRUCKS



... for more details circle 317 on enclosed return postal card

ROADS AND STREETS, May, 1961

## Distributors: Prequalify Your Customers



M. Clare Miller at the AED meeting.

### AGC's M. Clare Miller at AED convention offers equipment men five concrete suggestions to help restore industry profits

**S**ELDOM has a contractor been so much to the point as was M. Clare Miller, Kansas road contractor, president-elect of the Associated General Contractors of America, in addressing the Associated Equipment Distributors at Los Angeles.

Or at least this was the reaction of listeners, as Miller gave equipment dealers five pieces of advice on their dealings with contractors. Speaking at AED's annual meeting, February 9, under the title, "Is The Customer Always Right?" he answered, "Of course not," but it can be presumed that the distributor's business and the contractor's are so closely interdependent that there is "virtually no possibility of separating their financial destinies."

The rightness or wrongness of the customer, said Miller, boils down to two factors that concern the equipment supplier: *the customer's financial condition, and his confidence and respect for his distributor.*

Based on recent nation-wide trav-

el and contact in serving AGC, Miller noted the almost universal deep concern over business conditions within the construction industry. Such terms, "diet at a banquet" and "profitless prosperity" have come to mind everywhere.

"While I would not for a moment hint that you distributors have contributed even slightly to this unhealthy business climate," said Miller, "I am suggesting that you can — and, I believe, will — make an important contribution to our industry's recovery and survival."

With survival in mind, Miller spelled out five rules which he ventured would go a long way to strengthen the average contractor's confidence and respect for distributors. These rules are listed from Miller's discussion of them and arbitrated in the following:

1. *Pre-qualify your customers.* "Or if you prefer, carefully evaluate the abilities of your prospective or active customers." Mainly as a

means of avoiding trouble, awarding agencies do this, even though protected by performance and payment bonds . . . a luxury the distributor cannot enjoy. Failure to properly evaluate customers may put the distributor in double jeopardy.

A successful construction spread requires capital, supervision and equipment. To be unbalanced in any of the three is to invite disaster. Equipment must stay in balance if the dealer is to have the repeat customers so vital to his success.

"The contracting industry," said Miller on this point, "believes that X amount of construction requires Y amount of equipment. You may not agree, but if you do, we must assume that business will be better when that Y amount of equipment is given to those who can produce a profit, contractors who can pay for it without the desperation bidding that has been wrecking both our businesses."

"Some of you may think the theory is sound, but what about the questionable sales my competitor will make if I don't? My answer is: *let him make them*. It takes a lot of legitimate sales to balance a sour one, for what really matters is whether your year-end figures are red or black, not how many digits are involved."

Although volume is of utmost importance, it is not the perfect solution, Miller went on. "While our industry, like yours, is always searching for bigger and better markets, our efforts are sobered by the certainty that, although 1960 highway construction volume was about double the 1954 volume, our industry's financial condition is much weaker today than then."

"During those expansion years, contractors neglected to include a very necessary and important item in their bidding . . . *profit*. Nothing can be more fatal to business than failing to recognize the importance of profit, or to give it its rightful place at the top of every deliberation."

"In my visits with AGC members I have expounded the theory that the only way to make a profit is to concentrate our resources on fewer jobs. We can thereby create an efficiency that might permit a profit-margin, instead of taking the volume route that so thins our resources that efficiency decreases to a point where profit is almost impossible to reach."

2. *Leave financing of parts and services to others*. On this topic Miller said, "I know of no better way to lose a customer — or a friend — than to let his accounts hit your 90 to 180 days past-due column. When you hit the cut-off date, the odds are even greater that your former customer will be paying your competitor cash for his goods, while you are out scrambling for the additional business you need to make up for his lost account."

"My colleagues and I repeatedly compete with bidders who finance their operations on what they owe to you and to others. Although these firms soon go out of business, they can seriously depress the market so long as you permit them to work on your money. Those of us who maintain current accounts have a real right to complain, long, loud and lustily."

3. *Know your product*. Here the AGC leader suggested that distributors follow each sale into the field, to learn first-hand what that product will do when it's actually on the job. A contractor's cost estimates are based on what he thinks he can produce. Therefore, "the next best way to lose a customer," said Miller, "is to give him inaccurate production figures on your goods. If a machine in the field turns out 60 to 90 percent less than you stated, brother, you've had it . . . and so has your customer!"

4. *Leave the estimating to the contractor*. "If you or any of your employees are infallible estimators, you're in the wrong business. Our industry would pay almost anything for such a phenomenon, if he existed."

"Estimating is a field where everyone loses. Estimate too high, you lose the job. Estimate too low, you find trouble. I should know because I have been estimating over 30 years and I have yet to be on the nose."

"If a customer needs you to help him estimate his ability to do things, then he is a candidate for your delinquent account list or for bankruptcy. The good way to lose a customer is to advise him he can do a certain job at a certain price—then have him find it actually costs him much more."

"The AGC national office has received complaint after complaint from contractors about several manufacturers," Miller said on this score. "These firms have been making quantity take-off and production estimates on larger projects, and then have been issuing them to prospective bidders through distributors. While it is not our prerogative to tell manufacturers how to conduct their businesses, you might be interested to learn that we have found an AGC member who approves of this practice, and that the list of those registering serious objections is growing rapidly."

Miller's considered opinion: if a prospective bidder needs assistance on a quantity take-off or on a production estimate for any project—especially a large one—then he really leads with his chin when he submits his bid.

5. *Preach the gospel of ownership expense*. The really successful bidder is the informed bidder, was

Miller's final punchline. The greatest factor contributing to the high failure rate among contractors is a lack of cost knowledge, he said.

"Since ownership expense is a most important cost factor to the contractor and, since you people are best qualified to know its many facets, you should constantly remind your customers of this expense. In so doing, you enhance the customer's ability—through proper bidding—to buy replacements as they are needed."

In closing, contractor Miller said, with a touch of candid good humor, "We would fervently hope you won't ask us why we plead, cajole or brow-beat you distributors for an exorbitant price on our trade-ins—and then raise Cain when you are lucky enough to shift our junk to a competitor. If we knew the answer to that, we would be smart enough to figure why we contractors always bid so low . . . and that knowledge would create a Utopia for us all."

## Sensible Thinking on Senseless Bidding

(One of a series of "Thinking Cap" editorials by Milton Hendrickson in the employee magazine of Hendrickson Bros., Inc., contractors of Valley Stream, N.Y.)

In reviewing the nature of bids submitted by heavy construction people on public projects during the past year, it becomes apparent that little regard was paid to costs. This can result in an unhealthy condition. It can be possible for the owner or taxpayer to suffer, because sound work cannot be produced for less than it costs to do the work. The contractor himself will suffer possible financial loss including, in many cases, the banks or the bonding companies.

In times of increasing costs it seems foolhardy to bid continually lower. Economically this practice can prove itself to be ruinous. So far as this Company is concerned it has always been and will continue to be our policy to bid jobs as we see them. Competition is not competition when prices go berserk. It is our intention to weather the storm and to be very much in the running when bidding comes back again on an even keel.

## SAE EARTHMOVING CONFERENCE

Continued from page 55

suppliers do have their own ideas on this subject but that they do not want to offer recommendations on equipment while it is still under the manufacturer's warranty. But after this warranty is up, many suppliers suggest that contractors go to a single lubricant or grease for all applications to a particular part. He said that users of heavy equipment can look forward to the day when they will use a single engine oil, a single multi-purpose gear lubricant, and one multi-purpose grease. This will not only simplify lube operations but will significantly reduce the inventory required: one multi-purpose grease, he said, has been found to eliminate as many as seven other greases.

Contractors can find other benefits in reducing the number of lubricants used:

*Products can be bought in the largest package size, with reductions in cost.*

*There is less possibility of error in application.*

*Inventory records are simplified; less paperwork is needed.*

*With fewer packages to open, contamination is reduced.*

Referring to proper housekeeping and servicing procedures, Rudolph said it has been found that the lube product frequently becomes contaminated *after* delivery to the contractor. It is then dispensed into engines, gear cases and hydraulic systems through dirty dispensing containers. And grease guns repacked with dirty paddles add further contamination to the product. Too few contractors follow the practice of using a gun-filler pump, which is installed, with cover, on the grease drum immediately after it is opened.

Records consistently show, he said, that the rate of wear of a unit is in direct proportion to the amount of dirt that gets into it. A major source of entry of dirt is contaminated lubricating material. Tests made on lubrication samples taken from tractor transmissions showed that the amount of wear particles in the four units surveyed was directly in proportion to the dirt present.

As if to underscore Rudolph's remarks on the desirability of single lubricants for parts, the following statement was offered from the audience: "In our experience, the fitting is going to get greased with whatever is in the grease gun."

The following question was also asked: "To get more simplified lube specs, wouldn't it be easier to go directly to the manufacturer of the component part and get him to simplify his own requirements?"

To this, Rudolph said that this was the area where the greatest divergence exists. He said that makers of axles, transmissions, engines, etc., often carry opposite viewpoints,—among themselves—of the proper lubrication desired . . . "and they will probably continue to do so."

Dr. Gerald W. Johnson, associate director of the Lawrence Radiation Laboratory, University of California, spoke on current "space-age" developments in earthmoving—specifically, the possibilities of using nuclear explosives for excavation purposes. He said that more than 100 people at the laboratory have been working on the "Plowshare" program, exploring

means of applying nuclear forces to peacetime pursuits. The program at present involves examining the nature of the explosions, designing large-scale field explosions and demonstrating thereby what possibilities might exist.

Johnson said that explosions ranging in energy release to the equivalent of from 115 to 19,000 tons of TNT have been fired deep under mountains and at shallow depths. These are used to answer questions such as: what is the maximum crater width (and thus the degree of excavation) that can be gained with a stated explosive force fired at a stated depth.

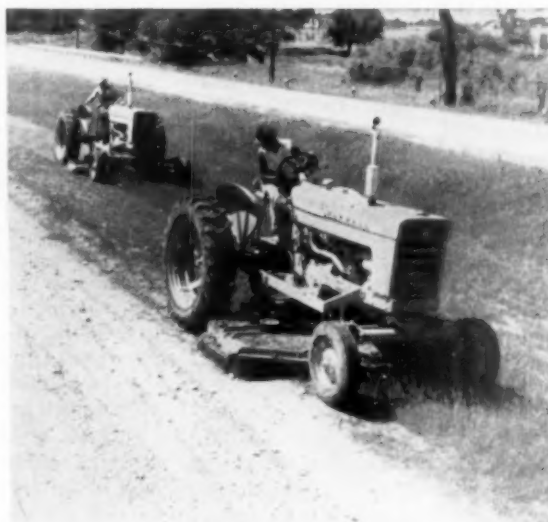
Practical application of this technique is envisioned, at this time, in excavation for canals, stripping of overburden, and other tasks where mass excavation is one of the requirements. A practical test is being prepared on the northwestern coast of Alaska where five 'shots' will be set off to cut a channel 2,700 ft. long. Total excavation here is estimated at 30 million cu. yd.

Johnson said that the Soviets have been using this system in the construction of dams and canals—possibly, he added, because of a scarcity of conventional earthmoving equipment. The problems to be overcome before such use of nuclear power can be used in the U.S. include psychological and public relations factors, besides the technical considerations yet remaining.

Such a revolutionary advance in earthmoving would not compete with standard practices, he said, but rather would probably stimulate programs and the undertaking of some projects which are now lying dormant.

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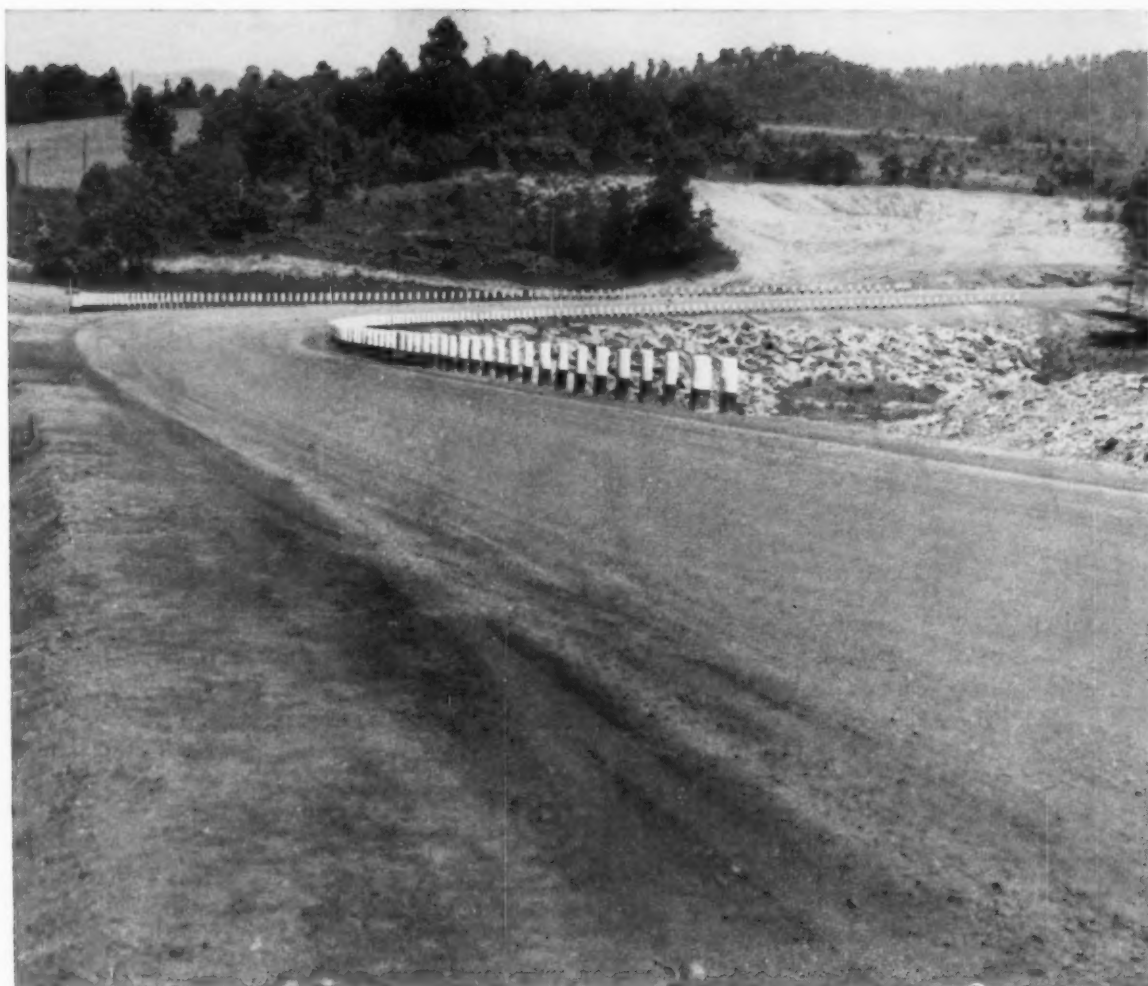
### Roadside Trimming in Texas



Texas highway department employees are here operating two of eight new Farmall 460 tractors, bought by the department to trim a roadside near Fort Worth. The attachments are International Danco weed choppers, each of which cuts along four miles per day working in second gear.

---





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**ROADS AND STREETS, May, 1961**



Diesel pile hammers do away with need for compressor or boiler on the pile rig, operate with an energy cycle that has advantages for many pile driving jobs.

## How the Diesel Pile Hammer Works

By Mogens Rand, P.E.,  
Boston, Massachusetts

### Know Your Equipment

One of a Series

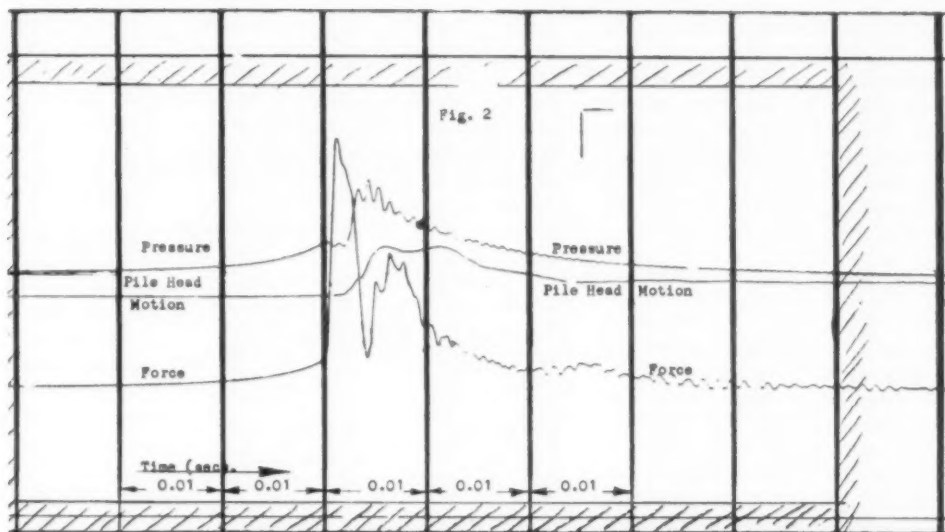
Pile driving hammers operated by built-in diesel power units have become an accepted tool in United States construction work during the past seven years. In spite of the diesel hammer's simple design and operation, a good many construction people still do not fully understand the fundamental principles involved. A common impression is that the diesel cycle is just a lifting device, as is the steam in the single-acting steam hammer. A closer examination, however, will soon reveal the differences.

The following description pertains to the Delmag hammer, representing one of three variants commercially available in the U.S. today. The details of the Delmag's working cycle can be understood by means of Figures 1 and 2, showing the design. It consists of a long vertical cylinder (4) which contains a free moving piston (1) and is closed at the bottom by the movable impact block (6). The latter is provided with rings for proper sealing and is free to move about 8 in. in the cylinder. The top of the block contains a concave bowl, the bottom rests on the cushion material of the anvil. A fuel injection pump, activated by the lever (10), is attached to the side of the cylinder.

The unit is started by hoisting the piston (by winch or crane) while through the ports (9) fresh



Figure 1. High-speed oscillograph records of a Delmag D-12 hammer in operation.



air is drawn into the cylinder. The piston is released automatically upon reaching a set height. As it passes the lever (1) on the downwards motion, a small amount of fuel oil is squirted into the concave bowl.

As this is done before the ports are closed, the temperatures and pressures in the cylinder are so low as to make any combustion impossible.

When the piston closes the ports, the air ahead of it is being compressed; and as the piston hits the impact block, the main blow is given to the pile. At the moment of impact, the oil in the bowl is being atomized into thousands of tiny fuel particles which are thrown into the compressed air in the annular combustion chamber (8) causing instantaneous combustion. The extremely high pressures developed exert forces on the impact block and on the piston. Through the former these forces are transferred to the pile while the latter is being thrown up. On passing the ports (9), the combustion gases in the cylinder are exhausted to the atmosphere. Fresh air is again drawn in and when the piston reaches the top of its travel scavenging has been completed and the piston falls down starting a new cycle.

The important feature of this unit is the proper timing of impact

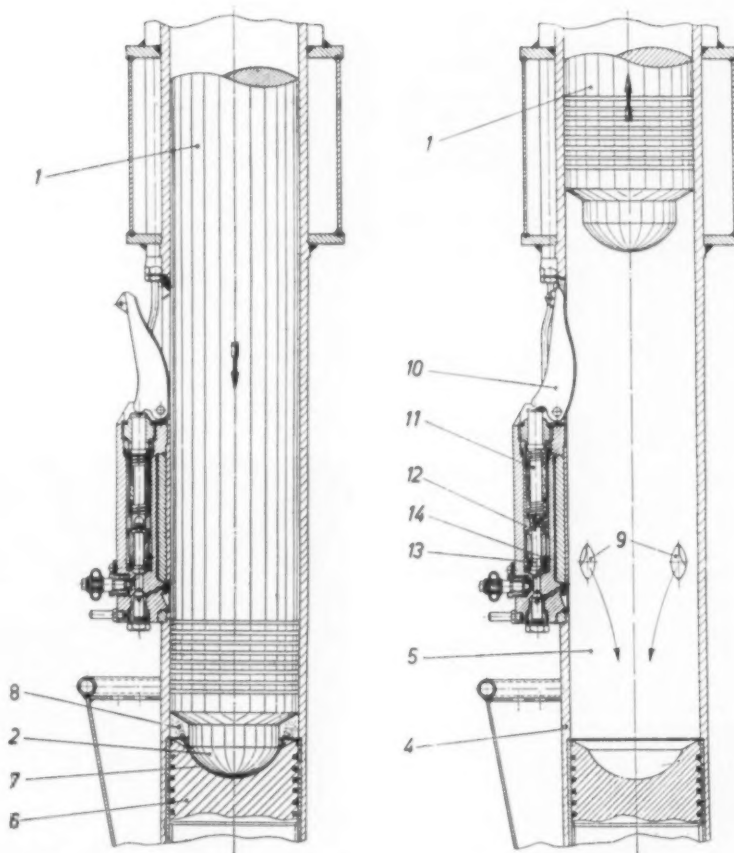


Figure 2. Cross-sections showing the mechanical features of the Delmag diesel hammer.

and combustion to achieve an efficient blow. The falling piston gives off its kinetic energy to the impact block which in turn activates the pile. The latter starts moving down, and during this motion the explosion takes place, thus adding additional force to the already downward moving pile.

This is clearly demonstrated in Fig. 1, which shows a recent high-speed oscillograph record taken during the operation of a Delmag D-12 hammer. Three different items are recorded simultaneously as a function of time: Pressure in the combustion chamber, forces on the pile head and movement of the pile head. Studying the graphs closely we find that during the compression of the air a gradually increasing force is exerted on the pile. At the moment of impact this force rises quickly and soon after peak value has been reached the pile starts moving. At about the same time the explosion takes place as indicated by the steep pressure rise. The combustion develops forces which are transmitted to the pile and we see indeed that a second peak is reached on the force graph. The magnitude is shown to be somewhat more than half the peak value developed by the first direct piston blow.

The major part of the impact, combustion and pile motion is accomplished within 10 milliseconds time.

Once the details of the graphs and operational characteristics have been understood, it becomes apparent that this type of pile driver is not simply a drop hammer using the diesel cycle as a lifting device. On the contrary the combustion develops large forces which are transmitted to the pile while this is still in motion.

The energy delivered to the pile is constant because at each stroke the same amount of fuel is injected. It is the conversion of chemical energy in the fuel into gas pressures during the diesel cycle which makes the hammer operate. Depending on the soil conditions, different piston jumping heights are involved. But this has no influence on the output of the hammer. In soft soils the pile moves further down and less pressure is given to the piston resulting in small rebound heights. As the driving becomes harder, the penetration is decreased and more pressure exerted on the piston throwing it up higher. The rebound height is thus more an indicator of soil resistance and it is obviously erroneous to derive any output from this.

The combined effect of impact and combustion pressure produces a most desirable blow which is particularly apparent when driving precast concrete or steel sheet piling. Damage to pile heads is less than for steam hammers of equivalent energy.

This is only one of the many advantages of the diesel pile driver. The combination of power plant and hammer in one unit simplifies transport and handling. Smaller cranes can be used and for operations requiring barges, it is indeed versatile.

Moving from one pile to the next, or from one pier to another farther away, can be done without consideration of hose length, boiler or compressor locations, as all these accessories are not needed. The absence of such expensive equipment with high capital costs and maintenance expenses naturally makes the diesel pile driver very attractive even for the small contractor with limited work in the foundation field.

Of the many difficult tasks performed lately, two should be mentioned: Bridge Foundation at Great Bras d'or, Nova Scotia and piers for Port Lavaca Causeway in Texas. The former had piles up to 196 ft. at 89 lb/ft. and the requirements called for 100 tons design load with 200 tons test load. Measured net settlements in the deep water bedrock were 0.07-0.15 in. after 200 tons load had been applied. The latter used prestressed concrete piles 20 x 20 in. with 11 in. diameter center hole, 80-90 ft. long. Here the test load was 120 tons. Both these jobs were done with the Delmag D-22 unit having a ram weight of 4800 lb.

## Side-by-Side Trailers Move Big Girders

E. L. Murphy Trucking Company, nationally-known specialized carrier, was recently called upon to solve a major movement problem: how to transport a 200,000-lb. steel structure measuring 17 ft. wide and 130 ft. long from St. Paul to a site in downtown Minneapolis. Richard T. Murphy, president, gave the problem his personal attention and came up with this solution. First, the structure was broken down into four individual sections, each 65 ft. long and weighing 50,000 lb. Then each section was loaded on two 38-ft. heavy-duty Dorsey Giant Platform trailers and carried in this unusual manner to the building site.



## Iowa Extends Its Left-Side No-Passing Signs

By the end of 1960 the Iowa state highway commission had installed more than 17,000 pennant shaped warning signs in no-passing zones. This growth from an experimental 589 signs on US 30 late in 1958 verifies the Iowa engineers' philosophy regarding the average driver. They believe that the average driver will obey a reasonable law if he is given a clear reminder of his responsibility at the right time and place.

This thinking led to the conclusion that the illegal passing problem on Iowa highways was caused primarily by: (1) inability of many drivers to see the usual yellow paint lines in time to obey the law; and (2) failure of the yellow paint lines to give some drivers a strong and immediate impression of the law.

The new reflectorized sign is tri-

angular in shape, 34 in. across the base and 41 in. from base to tip. Two things make this sign unique and effective. First, the shape differentiates it from any other sign which the motorist sees. Secondly, the decision to place the sign on the left side of the highway, while differentiating Iowa policy from that of many other states, makes it almost impossible for the motorist to miss seeing the sign. It has been noted that several states use a square no-passing sign placed on one or both sides of the highway.

Iowa officials are unanimous in their belief that public acceptance has been enthusiastic. The highway commission so indicated by approving its engineer's recommendation for 7,500 additional signs, at a cost of approximately \$100,000 for the 1960 program.

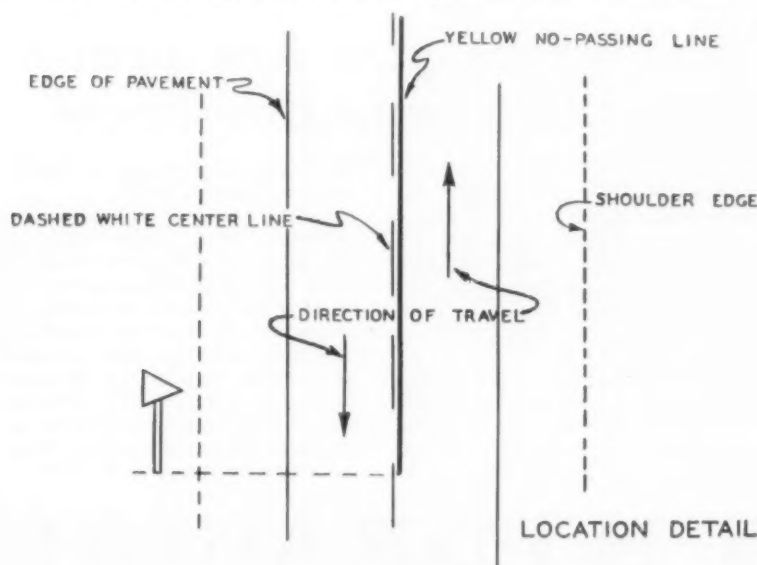
Major James Macholz of the Iowa

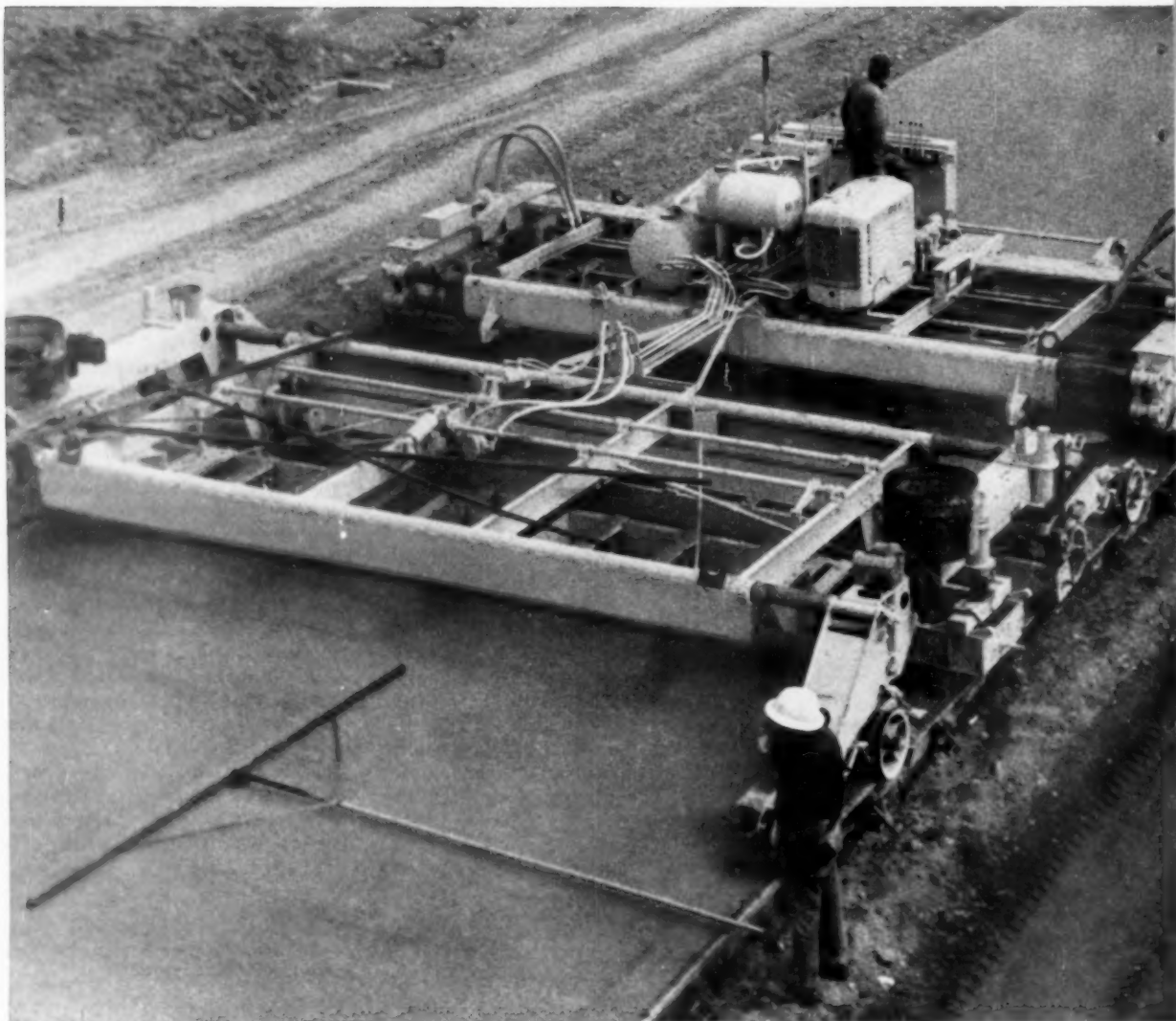
highway patrol told *Roads and Streets* that traffic records show at least a 50 percent reduction in passing violations since the signs came into use. This reduction is verified by aerial spot checks. Macholz strongly supported the policy of placing the signs on the motorists' left as he felt that signs on the right are often blocked from view. He also commented favorably on the 5-ft. height off the ground; his opinion is that many present signs are too low to be easily seen from the modern low-slung car.

Experience in Iowa has shown that a motorist quickly becomes accustomed to the signs, and after leaving Iowa definitely misses the service they render. These signs were found to be particularly effective where neither terrain nor a curve gave advanced warning of a no-passing zone.

Left-hand position of the sign breaks with precedent but is regarded as a factor in its effectiveness.

The sign, located as diagrammed, gives the motorist a needed extra reminder.





## You can lay pavement you are proud of, with a cost-saving smaller crew

Many road builders still don't realize how completely they can mechanize the work behind their pavers.

With a Jaeger paving train, big crews are not only uneconomic — they are unnecessary. *The machines do the job.* Spreading, 4-screed finishing and floating can be done by two operators, or three on high production 2-course work. Width changes are accomplished by hydraulic self-widening. Pitched slab and superelevations are paved with diagonally adjustable screeds that

can lay and finish material *up-hill*.

Forward progress never stops. And when you're through, you have pavement you can be proud of — dense, even textured slab, precision-smooth surface — ready for final edging and the burlap float.

### HYDRAULIC-SMOOTH

Jaeger hydraulic power, giving easy finger-touch control of all spreading and finishing functions, means fast, smooth and more accurate operation. It's easy to keep up with today's new-

est pavers. And common mechanical problems are eliminated.

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THE JAEGER MACHINE COMPANY, 223 Dublin Ave., Columbus 16, Ohio. In Canada, write Jaeger Machine Co. of Canada, Ltd., St. Thomas, Ontario. Worldwide sales and service through Jaeger International Corp., Apartado 137, Panama, R.P.

# JAEGER HYDRAULIC





#### ↑ LOOK WHAT ONE MAN CAN DO

Jaeger Finisher, with two screeds, pulls Jaeger Finisher-Float with oscillating screed and 30" wide float pan. One man easily operates both machines with all-hydraulic controls.

#### 4-to-1 CORRECTION

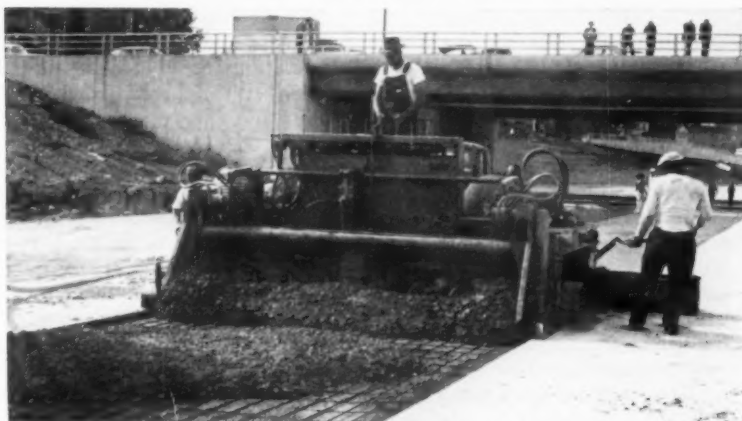
Note that the Finisher-Float carries its screed and float pan suspended between long side trucks on bogey axles. This provides a 4-to-1 ratio of correction independent of any irregularities in the adjacent side forms. This final "kiss" finish leaves a machine-perfect surface, ready for edging, burlap drag and curing spray. With Jaeger equipment, the machines do the job.



**POWER AND CAPACITY, UNDER FINGER CONTROL:** This northwest Air Force base runway slab is 27' wide, 15" thick. Specifications required a full screed at all times. The Jaeger all-hydraulic Finisher has the smooth flow of power, ample traction and finishing capacity needed for any work.



**TOWS MESH BRIDGE AS IT SPREADS:** This Jaeger 20'-26' Screw Spreader, working on 9 miles of Interstate 94, by-passing Fargo, N.D., hauls with it enough reinforcement for each half-day's run. Hydraulic power gives operator finger-control of big dual reversing spreading screws.



**ONE-MAN MACHINE DID IT ALL:** This Jaeger 12'-18' combination Spreader-Finisher, starting run on Chicago's Congress Street Expressway, is here set at 12'. It carries 18' diagonal screed with adjustable end shoes. By hydraulic self-widening, machine adjusted itself to 6' flare of the slab without stopping. This one machine did the whole spreading and finishing job, behind a 34E dual drum paver pouring at capacity.

# PAVING EQUIPMENT

...for more details circle 300 on enclosed return postal card  
ROADS AND STREETS, May, 1961



Thirty tons of earth discharge in less than 10 seconds through this fast-acting "mud-gate" under the loading hopper.



Hopper operator wears sealed helmet and face shield connected to a blower-filter (upper left). This scheme paid for itself quickly by eliminating operator "down time."

pause for weighing. The weighed and hopped material would be loaded into long-haul equipment driven through a trench beneath the hopper.

In the station's final construction, two steel plate girders, each 50 ft. long, salvaged from a railroad bridge, support two scale platforms, separated by a 10 ft. wide grizzly over a 40-ton hopper. The two scale platforms are linked to a single Champion scale dial in an adjoining scale house.

A clamshell type gate, modified from a Challenge-Cook Bros. bottom-dump "mud" gate, controls hopper discharge into the haul equipment. Fast operation results from the use of two double-acting 8-in. air rams controlled by an operator suspended on a cage below the bridge and to one side of the loading vehicles.

This movable assembly accomplishes several things. Loaded scrapers reach it by a short downhill run. Operators stop only once for weighing and discharge. No supplementary handling equipment such as dozers and belt loaders is needed to get material into haul equipment.

Scales, hopper, rams and air power equipment along with the scale house comprise a single unit that can be quickly skidded to a

new location after trenching for the underneath loading pass. It is relatively easy to relocate the assembly to assure most profitable use of the DW21 scrapers. Generally, it is kept within 800 ft. of the pit area being worked.

The built-in speed and efficiency of this combination unit (25 seconds to weigh, unload and discharge 30 tons into the long haul equipment) put the pressure on the pit operations. Steady feeding of such a unit became the challenge.

#### Double Tandem Pusher Train

Rather than load the scrapers with slow-moving crawler pushers, Brown decided on a high-speed pusher train of four DW20 tractors modified with special pushing blocks and ballast weights. The pushing blocks consist of spring-mounted bumper shields mounted on the front of the tractors. Further cushioning against shock to equipment is secured by fastening a section of a used scraper tire over the block. The ballast, running from two to three tons, is boxed at the rear of the tractor to provide more traction.

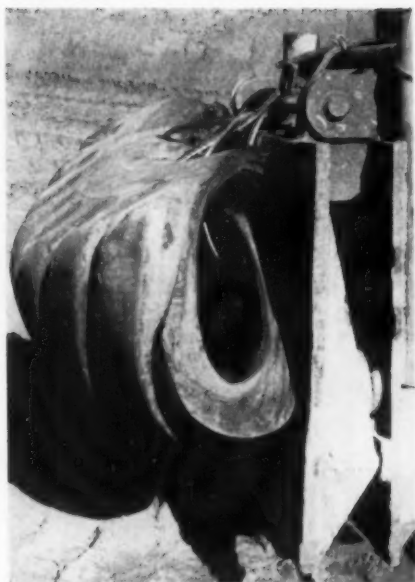
Depending on pit conditions, these four pushers make a balanced team with three to five DW21s. The

afore-mentioned 2,700 to 3,000 tons an hour is based on a cycle time for each scraper of 150 seconds with the 800-ft. (plus or minus) one-way haul—certainly a remarkable efficiency.

Scraper loading is done in alternate directions along a 300 to 500 ft. area with movement precisely timed to bring an empty scraper into alternate ends of the pit just as a loaded scraper pulls away from the pusher train. The train only loses about 10 seconds out of contact.

The company men figure it would take two good sized belt loaders backed up by from seven to nine large bulldozers to match this performance. Obviously, Brown's ability to move out this much material with four DW20 tractors and five scrapers is resulting in an equipment saving. The DW20's, incidentally, were bought second-hand, as a further "economy."

Other problems are simplified, too. One pit foreman can easily oversee the pit-loading and reloading. Fewer machines mean a smaller investment per ton hauled, need for fewer operators, and lower maintenance costs. It means that Brown can run a "taut ship" singlehandedly.



Cushion for pushing plate on each DW20 tractor—heavy springs and sections of old scraper tires.



DW21s pulling job-modified Challenge-Cook Bros. bottom-dump trailers are proving economical and versatile for Earl Brown's long-haul operation.

### Haul Also Geared Up

With high production in the pit and at the loading station assured, Brown had to speed his long-haul fill movement without pyramiding costs.

Once he conceived of the idea of towing a 30-ton bottom-dump semi-trailer behind the DW21, he proceeded to sell the prime contractor on the fact that this would cut expected costs enough for the contractor to lease a private 60 ft. off-highway right-of-way from the borrow to the fill areas—a distance ranging from 2.5 to 5 miles.

There is nothing unusual about the 30-ton semi-trailers being used behind the DW21s for haul work. They are standard BDS2C 20 cu. yd. semi-trailers manufactured by the Challenge-Cook Bros. Mfg. Co. The units are fitted with air-operated mud gates for rapid discharge. The two-axle dollies supporting the front end of these trailers were job-fabricated by Brown from war surplus equipment. The air dump and brake mechanisms of the trailers are tied into the air system of the DW21.

Brown's fleet of seven such 60-ton capacity scraper-trailer units is supplemented by 10 to 25 truck-tractor bottom-dump rigs. With both types of equipment following side by side over the same route, the scraper-

trailer rigs have proven to be strikingly economical, according to Brown, and have provided some important secondary advantages.

An obvious advantage is the extra power and traction available from the DW21. It can mount the steep grades in the spread area easily, even when hauling the loaded trailer, without need for the pusher assist usually required be-

hind conventional truck haulers. The scraper itself spreads as it dumps, something the bottom-dumps cannot do. Power plus maneuverability mean the scraper-trailer units can work easily in cramped quarters. The large scraper tires also aid in compaction.

Fast movement of scrapers and pushers in the pit, and of long-haul

*Continued on page 142*

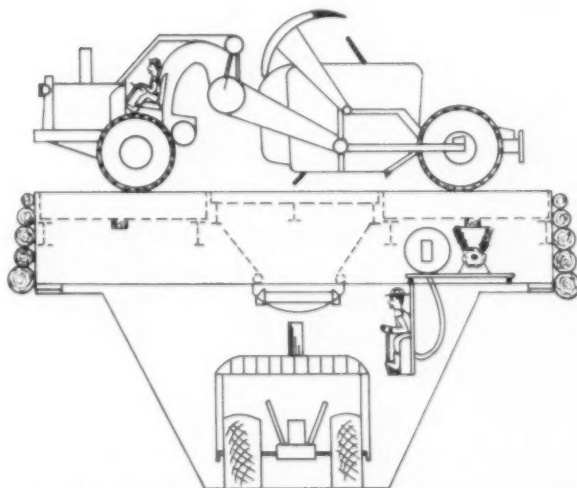


Diagram showing general scheme of the portable bridge-hopper-weigher assembly devised by contractor Earl Brown and his staff.

# It's New!

## "EUC" S-24

- ▲ **MORE POWER** . . . 432 h.p. with GM 12V-71 engine.
- ▲ **MORE CAPACITY** . . . 24 yds. struck, 32 yds. heaped, 80,000 pound payload.
- ▲ **MORE WORK-ABILITY** . . . Torqmatic Drive with converter lock-up and splitter gear that matches power and speed to every job requirement.
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- ▲ **MORE SERVICE ACCESSIBILITY** . . . engineered for easy servicing and maintenance that cuts downtime.

HERE'S BIG NEWS for users of big scrapers! The new Euclid S-24, with payload capacity of 80,000 pounds and 24 yds. struck capacity (32 yds. heaped), is ready for your big yardage projects.

Powered by a 432 h.p. engine with Torqmatic Drive, this new "Euc" is 'way ahead of even the newest big single-engine scrapers. Have your dealer show why this S-24 belongs in your profit picture and can be your ace-in-the-hole for that next bid!

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FOR MOVING EARTH, ROCK, COAL AND ORE



**EUCLID S-24**

**OBSOLETES "NEWEST"  
SINGLE-ENGINE  
OVERHUNG SCRAPERS**



**432 HP... 80,000 pound PAYLOAD**

## NOVEL PIT LOADING

Continued from page 139

tandems on the spread, is made possible by keeping both working areas smooth through use of a pair of BeGees towed by a DW20 tractor. Both of these tractors are fitted with pushing blocks so they can do double duty when required.

### Filter Hat for Workers

Increasing worker efficiency has not been overlooked on the job. Loading hopper work is dusty, and constant exposure to the dust inevitably slows the job of loading the haul rigs. Brown estimates he has increased his loading output by at least five loads per day (150 tons) by using a newly developed enclosed helmet fitted to a filter-blower. Called the Jamieson "White-cap," this helmet fits tightly over the shoulders, chest and back of the operator and provides him with air filtered to one micron. It is estimated that this \$140 unit repaid itself in three days.

The San Diego Freeway job here discussed is part of the program of the California division of highways in the Los Angeles district.

## New Hydraulic Cylinder Developed by Army

A special hydraulic cylinder designed to withstand rugged and continual use at 3,500 psi operating pressures has been developed by the U.S. Army Engineer Research and Development Laboratories, Fort Belvoir, Virginia.

The cylinder is for use in the Army's armored vehicle launched bridge. The need for a special cylinder arose when extended use of the bridge showed that the commercial tie-rod cylinder was inadequate and created maintenance difficulties. Instead of tie-rods, the new cylinder utilizes caps which are screwed onto the cylinder tube instead of being held in place by rods. The new cylinders were statically proof-tested to 7,000 psi pressure without evidence of leakage.

## Court

### Trespass By Road Contractor

In the widening of a street in Spartanburg, South Carolina, the frontage of a residential lot was condemned to 15 ft. depth. Award of \$700 had been made by the Condemnation Board. The lot owner had refused this as inadequate, and had given notice to the board that the determination of the amount of the award would be appealed.

After this award had been made by the Board, but three days before the property owner's notice of appeal had been given, the contractor who had low-bid on the street widening project received a copy of a notice from the State Highway Engineer, addressed to the District Engineer. This notice said, "Right-of-way acquisition has been completed on the above mentioned project and I shall recommend to both the State Highway Commission and the Bureau of Public Roads, that the Highway Department be authorized to award the contract to the above mentioned contractor.

"We are authorized to allow the contractor to begin work on this contract, with the understanding that no payment can be made therefor until a contract has been executed and that any work done will be at his own responsibility."

Thereupon the contractor began clearing the 15 ft. strip along the property, which was owned by an army officer on duty at a nearby military post. When he returned home that weekend the contractor's bulldozer was parked on the front of his lot, blocking his entrance to the driveway.

Judgment against the contractor for \$1,000 in a suit brought by the owner of the property for trespass was sustained by the appellate court of that state. "The trespass was an invasion of the owner's legal rights," said the court, "from which damages sufficient to sustain an action will be presumed even though such damages may be only nominal and not capable of admeasurement.



Impact cutting tried and abandoned: Truco Diamond Drills and portable equipment drill 123 holes 3"-3 1/2" in 13" reinforced concrete in just 42 1/2 hours

**PROJECT:** Veterans' Hospital, Minneapolis, Minn. **DISTRIBUTOR:** Enghauser Co., Minneapolis, Minn. **EQUIPMENT:** Truco Model B Portable Diamond Drilling Machine with 350 rpm drill motor; Truco Model S Drill Stand with 500 rpm Hand Drill Motor; Truco Tru-Vac® Vacuum Pad; Truco Diamond Drill Bits, surface set, resettable. **JOB:** Drill holes to permit removal of a section of 13" thick, reinforced concrete wall to provide access for new, bulky equipment. Jackhammers were tried but the noise proved unbearable to patients. So, Enghauser was called in and Truco equipment did the job with practically no sound, mess or disturbance to hospital routines. Truco Drill Stand (left, above) was anchored to the wall horizontally by a Truco Tru-Vac Vacuum Pad. Truco Model B (right, above) was braced to an I beam by its telescoping center post with shaft extension. A total of 123 holes, 3" and 3 1/2" dia. were drilled in an average of 21 min. per hole; time varied with the amount of reinforcing encountered. The slab weighed 8500 lbs. and was lifted out without difficulty. Savings are so great Truco equipment may pay for itself on a single job or in a single day. Write for new Truco catalog.

## MASONRY DRILLING DIVISION

WHEEL TRUING TOOL COMPANY

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## Decisions

"But there is nothing to suggest that the trespass resulted in any damage to this owner beyond that for which he has been compensated in the condemnation proceedings. The parking of the bulldozer on the cleared portion of the lot angered him, to be sure, but it cannot be said to have resulted in measurable damage."

*Hinson v. A. T. Sistare Construction Co., 113 S.E.2d 341, South Carolina, March 21, 1960.*

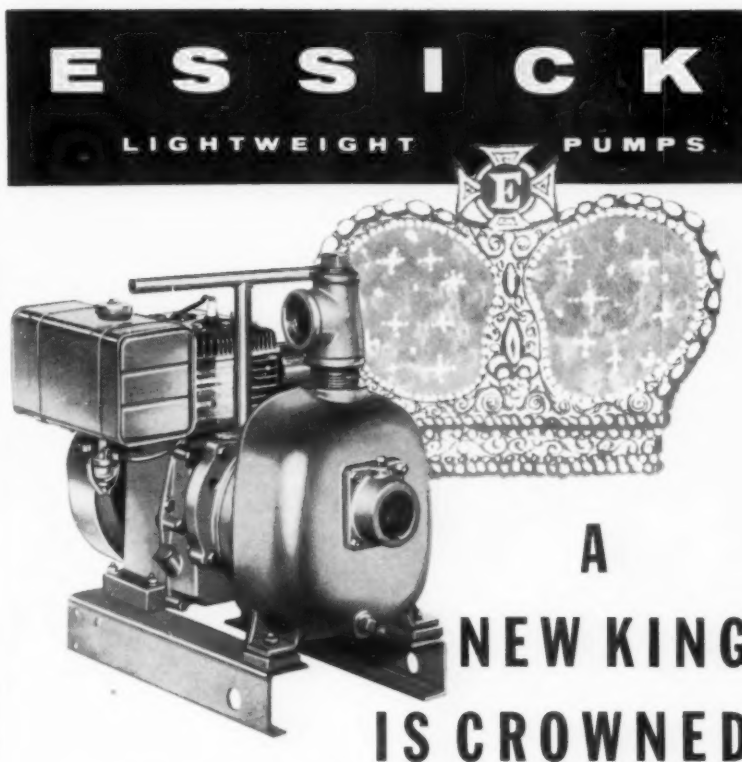
### Hauling Contractor Awarded "Difference"

A Michigan highway contractor entered into a contract with a hauling contractor to haul sand and gravel from the pits to his mixers. The Michigan Public Service Commission had set a minimum price for such work which had been duly published, and at first the legal minimum rate was paid. Then in July, 1958, the highway contractor notified the hauling contractor that he could get a lower price for the combined cost of supplying and hauling the material, and as a result the hauling contractor agreed to cut his price. This arrangement continued from July to October when the Public Service Commission stepped in with a warning, and thereafter the legal minimum was paid.

The hauling contractor later brought suit against the highway contractor for about \$16,000 representing the difference between the legal rate and the lower rate he had been paid from July to October. The highway contractor advanced the defense that as the contract for the lower rate was illegal, he was not liable. The Michigan Supreme Court ruled, however, that the legal rate was set in the public interest and that as the public interest was paramount, the highway contractor despite the illegal contract must pay the \$16,000 difference between the two rates.

(Robert McDanile Trucking Co. v. Oak Construction Co., 102 N.W. 2d 575.)

ROADS AND STREETS, May, 1961



THE TITLE OF "BEST PERFORMING ALL-AROUND PUMP" HAS MOVED TO THE NEW ESSICK

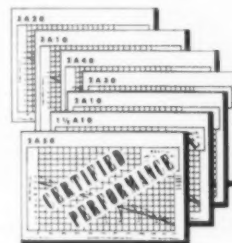
## CERTIFIED PERFORMANCE LIGHTWEIGHT PUMPS

We told our Engineering Department: "Design a lightweight pump line with no compromises, one that is entirely new throughout—one that we can certify to be the 'Best Performing All Around Pump' on the Market." A test on your job will prove to you they have produced a pump line that is entirely the peak of design and engineering skill in the lightweight field—Pumps that meet all types of pumping requirements.

\*PLUS—The Exclusive New Convert-a-Seal which allows seal conversions in the field.

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### ESSICK MANUFACTURING COMPANY

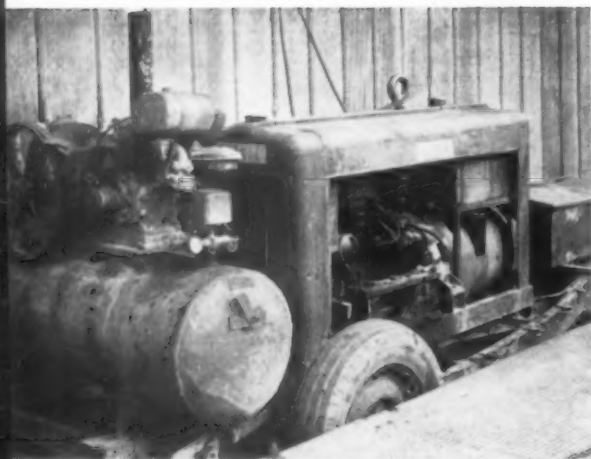
1950 SANTA FE AVENUE 850 WOODRUFF LANE  
LOS ANGELES, CALIFORNIA ELIZABETH, NEW JERSEY

affiliated with T. L. SMITH COMPANY, Milwaukee, Wisconsin.

...for more details circle 294 on enclosed return postal card



Chief mechanic Fritz Gens is building up the teeth on the bucket of a Link-Belt Speeder shovel.



Portable shop welding units handle much welding in connection with the firm's general repair work. The two-wheel trailer the unit is towed to jobs, and also carries a compressor and air tank for field servicing of equipment.

## 'ALL-OUT' HARDFACING

*Continued from page 54*

repairs involving sustained welding, the work is done with a Victor semi-automatic welder rated at  $\frac{3}{8}$  hp and delivering a maximum of 500 amps. This machine, which feeds wire at a predetermined rate, is usually set to deliver between 10 and 20 lb. an hour.

For build-up of crusher rolls, the filler used first is S. A. Manganese, a  $\frac{7}{16}$ -in. manganese steel wire developed by American Manganese Steel Division of American Brake Shoe Co. for open arc welding in a semi-automatic machine. For the hardsurfacing that follows, another American Manganese product is used—S. A. 53, a high carbon, high chromium hardfacing overlay. For ordinary hand-welding repairs on frames, etc., the company employs a mild steel, low hydrogen electrode.

THE NEW JERSEY state highway department has moved to reduce maintenance costs by accepting bids on a contract to spray grass along nearly 73 miles of highways with a chemical to retard its growth. The McMahon Brothers, Inc., of Tenaflly, was low bidder on this \$2,960 experimental spraying job.



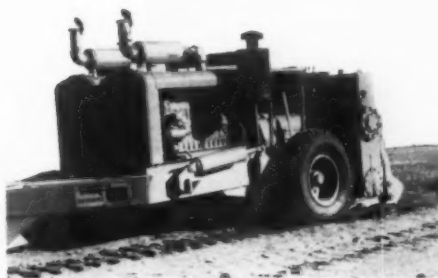


## Crush all your sub-grade, sub-base or base materials with the new **PETTIBONE WOOD PULVERIZER**

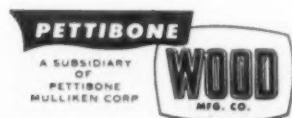
You get the advantages of lowest cost in-place crushing *plus* top production with the new Model 660 Pettibone Wood Pulverizer.

Working on an Interstate Highway job in the photo above, the Model 660 obtained a production rate of 600 tons per hour in crushing rock to 2½" minus. The material originally had 20% to 25% oversize. Even higher production has been reached crushing various materials to different sizes.

Learn how you can save taxpayers' money and increase production with the new Model 660 Pettibone Wood Pulverizer . . . write today for full details.



Pettibone Wood stabilization equipment is used for highway, airport and parking lot construction the world over. Write today for free job studies and your copy of "The A B C's of Soil-Cement Stabilization", an informative, 36 page booklet on stabilization techniques.



## **PETTIBONE WOOD MFG. CO.**

P. O. BOX 620, NORTH HOLLYWOOD, CALIFORNIA

*Originators of mix-in-place roadbuilding equipment*

... for more details circle 330 on enclosed return postal card

ROADS AND STREETS, May, 1961

145

# *Across Dynamic Southern California...*

## **SAN DIEGO GAS AND ELECTRIC CO. MEETS BOOM WITH GAR WOOD-BUCKEYE DITCHERS**



San Diego is moving almost as fast as the jetliners and missiles made there. The population has nearly doubled in the past 10 years. In San Diego County, in 1959 alone, 28,788 new dwelling units were built. All this means plenty of work for the San Diego Gas & Electric Company.

To handle one of its toughest jobs—digging trenches for new gas lines—the company operates a rugged team of 12 Gar Wood-Buckeye ditchers.

Speed is important in gas line ditching—you have to match the fast pace of modern construction methods. And speed is what Gar Wood-Buckeye ditchers offer; speed, precision, and both ease and economy of operation.

Since their introduction, the Gar Wood-Buckeye 305, 307, and 308 utility ditchers have become recognized as the most modern wheel-type utility ditchers on the market. One reason is hydraulics—all three are equipped with a hydraulic wheel hoist and hydraulic conveyor drive as standard equipment. All three have main engine transmissions specially designed for ditcher use. All three have a split-shaft excavator drive for longer working life. And all three are operated with the simplest group of controls on any ditching machine.

From mammoth pipeline ditchers to the smallest utility machines, Gar Wood-Buckeye has led the field for more than 60 years.

## **SAN DIEGO, RIVERSIDE LATEST TO CHOOSE GAR WOOD LOAD-PACKER**



With an eye on both economy and efficiency of operation, sanitation officials in both Riverside and San Diego have chosen the Gar Wood Load-Packer 600.

Tremendous savings in refuse collection are possible with the Load-Packer. The reason: the Gar Wood unit packs between 25 and 50% more pounds per minute than any competitive machine. This speed of operation allows cities to use fewer machines for the same amount of work, and save thousands of dollars in labor costs each year.

Today, communities in every part of the world depend upon Gar Wood for efficient, economical, sanitary refuse collection.



## **San Gabriel Builder Calls Gar Wood Crane Key to Fast Pour Schedule**

Gar Wood truck cranes are helping to keep large construction projects on schedule in many areas of southern California. An example is this unit, used by the Beckner Construction Co., Inc. of South San Gabriel for precision spotting of concrete buckets. The builder states the Gar Wood crane is "a major key to concrete poured on-schedule."



## **El Segundo Hauler Chooses Gar Wood Dump Bodies and Hoists**

All types and sizes of Gar Wood dump bodies and hoists are in use throughout southern California. This unit was purchased by the Paramount Sand Co. of El Segundo for hauling blasting sand. The owner, Charles Settle, is shown talking with Phil Hanson, Los Angeles Gar Wood - St. Paul distributor. Gar Wood is the world's largest manufacturer of truck equipment.

# GAR WOOD'S AT WORK!

## *San Diego Freeway Contractor Meets Breakneck Schedule with Gar Wood Hopper Trains*



Southern California's road building program is on the move—and it's moving fast. More than 50 miles of freeway construction are projected for 1961. To a contractor involved in the program this means getting the highest possible production in the shortest possible time.



M. J. HOMEN

It's particularly true for Manuel J. Homen Trucking, Inc. of Upland—one of the largest dirt hauling contractors in California. Homen recently completed hauling 2.4 million tons of landfill for the San Diego Freeway project in record-breaking time. This contractor now is moving 3 million tons for another span of the freeway, under subcontract to the Griffith Co. of Los Angeles.

Again, time is of the essence. Homen's fleet of hopper trains is hauling 15,000 tons each day. Homen himself is so impressed with the production efficiency of Gar Wood hoppers that he recently purchased 11 new Gar Wood trains. His fleet now totals 30 trains—26 of which are Gar Wood.

"Competition in today's construction business demands equipment that will provide maximum payload, speed and versatility with minimum downtime," says Homen. "We're getting just that from our Gar Wood hopper trailers."

Homen's top-capacity payloads are made possible by the Mono-Shell construction of the Gar Wood hopper. Gar Wood has eliminated the heavy trusses found in other units and distributed the weight over a much greater axle span. In addition, Gar Wood's air-operated gates let Homen unload his hoppers while they are still in motion—sometimes as fast as 35 mph!

**GAR WOOD INDUSTRIES, INC.**

Wayne, Michigan • Findlay, Ohio

### **REVOLUTIONARY HYDRAULIC SYSTEM AT WORK ON LOS ANGELES SAND AND GRAVEL OPERATION**

Gar Wood's revolutionary new Variacs pump, controlling a Gar Wood dozer blade on a Euclid C-6, is saving fuel and maintenance dollars for the Century Rock Co. of Los Angeles.

This variable volume piston pump delivers oil *only* when there's a job to be done. It allows the operator to meter tractor horsepower to the requirements of both blade and

crawlers, thus saving both horsepower and fuel. And because Variacs works less and works easier, it has a far longer working life.

Variacs virtually eliminates heat build-up, the main enemy of hard-working hydraulic systems. It is both faster and stronger—combining significantly greater lifting power with almost twice the blade speed at ground level of competitive hydraulic systems.



...for more details circle 316 on enclosed return postal card

**ROADS AND STREETS, May, 1961**

## COMMENT

from the  
**BUTLER ENGINEER**

### ... Of a Giant Expansion to Meet Cement Demand

One of the great cement companies—with a confident eye to the immediate future—has just entered upon a nation-wide, multi-million dollar program in expansion and the establishment of new supply centers. It's big. And it means a whale of a lot to you—Mr. Ready Mix, Mr. Concrete Products and to you—Mr. Roadbuilder. First, because the program is based upon a careful study of immediate demand for cement. Second, because you will profit enormously from this activity. Companies of this magnitude don't bet millions if the future looks uncertain.

And we're glowing because those storage bins are made by Butler. Each line of 4 bins holds 8289 cu. yds.—and there are 9½ lines. And all are equipped with Butler Gates and Airflowmatic Feeders.

Incidentally, just to show you versatility in metals which Butler fabricates, we recently completed 5 aluminum bins, each of 392 yards capacity, for a large chemical company. It was a solution to a contamination problem. So what metal do you want? Let us know.

The Concrete Masonry Exhibits in the handsome and newly completed Cobo Hall, Detroit, was a lively and inspiring success... but there were many who figured it would be a colossal flop. Trouble stemmed from a jurisdictional misunderstanding by the unions. Really not intentional; it was born of inexperience in routines attendant upon a big machinery show. Situation beautifully and diplomatically handled by Mayor Miriani, and by a rational attitude by the unions—once they understood.

Recession? Man! We're busy.

*The Butler Engineer*

**BUTLER BIN COMPANY**  
WAUKESHA, WISCONSIN

## Contractor Management

### Annual Audit Can Cut Insurance Costs

**W**hether you're a multi-million-dollar contractor or you carry your office under your hat, you can better watchdog your insurance costs with proper records.

An insurance company's audit influences the ultimate cost of the road builder's insurance. Besides merely keeping orderly records, the contractor also wants to be aware of what premium should and shouldn't be charged. The difference can mean big dollar savings. The audit should be a two-way street—necessary for the insurance company while being beneficial to you.

Three main coverages for the road builder are audited. They are: (1) Workmen's Compensation (2) General Liability and (3) Automobile Liability. All carry a similar condition. In each the insurance company has contracted the right to examine your records, to determine the amount of premium you owe based upon the exposure you had.

Let's look at some specific ways you can help yourself.

#### Workmen's Compensation

The contractor is permitted to separate his payroll according to labor classification. Keep this payroll division accurate. Rates will vary several dollars by classification.

Workmen's Compensation rates vary by classification and by state. Most rates will change, sometimes very slightly, at least once a year.

Make sure those rates used on your audit coincide with those on your policy—or find out why not. You may have used them for bidding purposes.

Payroll by each classification has two important limitations: overtime should be charged only as straight time for insurance purposes; many states provide limitations of \$100, \$200 or \$300 average per-week limit. It will pay you to familiarize yourself especially with the \$100-per-week states.

Generally, partners and executive officers of corporations can elect to accept workmen's compensation benefits. Regular payroll limitations apply to officers; usually \$3,600 is used as payroll base for each partner.

After the premium is determined by multiplying manual rates  $\times$  payroll, the experience modification is applied. This factor reflects your workmen's compensation claims experience over a prior period of time. You can't do anything about this factor at audit, but its effects can make a big difference on your balance sheet.

Additional workmen's compensation premium will be charged to you for any subcontractors or hired truckers if they do not furnish evidence of coverage. This is simple to remedy. Make it an ironclad rule for any "subs" or hired trucks to furnish a certificate of insurance

... for more details circle 284 on enclosed return postal card



# If you lack funds and suitable materials for low cost road construction, read this

*These three machines can transform your old and broken secondary roads and municipal streets into sound, permanent low cost structures. Together, they're called the BROS TEAM; like a team, they handle work efficiently and each does its specialty to produce outstanding results.*

● First, buy the Bros Preparator. It is an in-place Material Reducer that employs 22 free-swinging hammers in reducing over-size rock, gravel and scarified asphalt materials. Production rates of 350 cu. yds. per hour are experienced by counties using the Preparator to reclaim old roads.

County savings over previous methods run as high as 50 percent. Materials produced have high, sharp angles of friction and closely approximate AASHO gradation specs for primary road materials.



● Now, using these Preparator-produced materials for stabilized road construction, you don't want anything but the new BROS self-propelled Roto-Mixer, Model SPRM-84, to do the mixing job. The vital problems of uniform mixing and control of forward speed and mixing rotor speed are licked! No "lugging down" or "stalling out" of the engine—and no "surging" of the mixer. This self-propelled in-place unit employs a unique design that requires only minimum HP for forward movement via a dual pump hydraulic drive system. It allows almost the entire HP output for mixing. Other revolution-

ary engineering and performance advances make this machine the dependable, high production unit you need. Optional spray bar adds water, asphalt or emulsions to the materials during mix operation.



● And, of course, the best materials and closely controlled mixing and blending are only as good as the compaction you put down. That's why the BROS SP-54B is the choice of thousands of counties and contractors. Superior engineering and safety design give this pneumatic tire roller full-time, trouble-free service. Full oscillation of front and rear wheel pairs. "Orbitrol" hydraulic steering and a choice of three models in the 6000 lb. to 25,000 pound ballast range. More major features unduplicated by other rollers are standard equipment on the SP-54B.



Get full information on any or all of these BROS Machines.  
See your franchised BROS Dealer or write:



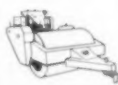
**BROS Incorporated**

1057 TENTH AVENUE S. E.  
MINNEAPOLIS 14, MINNESOTA

**ROAD  
MACHINERY  
DIVISION**



HI-HEAT  
OIL HEATER



VIBRA-PACTOR



30-TON SELF-  
PROPELLED  
ROLLER



10 AND 15-TON  
ROLLERS



SHEEPSFOOT  
TAMPERS



35-100 TON  
ROLL-O-PACTOR

BROS Products also manufactured in Australia and Brazil

... for more details circle 285 on enclosed return postal card

## CONTRACTOR INSURANCE COSTS

Continued from page 148

giving evidence of workman's compensation coverage. If he is unable to provide the certificate, then deduct the applicable rate from his contract price. The standard rule which auditors use in establishing a payroll base on a hired truck is one-third the cost of hire. The percentage of other subcontractor costs to be applied to the compensation rate depends upon the proportionate amount of material in the subcontract price. If you are uncertain as to how much to deduct, ask your insurance company for assistance.

At this point in your audit *Standard Premium* has been developed. *Standard Premium equals Payroll X Rates X Experience Modification*. From here is computed the kind of rating plan you chose at the beginning of the policy year. Chances are it is either a *premium discount* plan or a *retrospective* plan. Under *premium discount* your adjusted premium equals premium less premium dis-

counts and mutual or participating dividends, if any. Under a *retrospective* plan a basic percentage of the standard premium is added to the amount of claims you sustained during a specified period. Other factors including "loss adjustment" and "state tax multiplier" are figured in the retrospective formula. The possible combination of retrospective plans are too numerous to mention. However, the idea is to charge a basic amount, add the claims and the cost to adjust them. See the possibilities? Retrospective rating may be profitable or costly. Study it carefully before you decide which route to take.

### General Liability

At times general liability insurance becomes extremely complicated, and there are dangers in using generalities. But for our purposes in assisting you for the audit we will generalize to a degree. First,

many of the points regarding the Workmen's Compensation audit apply to General Liability. Secondly, a number of coverages can be insured under one policy. Usually the road builder is interested in covering (1) Premises and Operations (2) Contractors' Protective (*Independent Contractors*) (3) Contractual, and (4) Completed Operations liability exposures. Other coverages can be included, available in several policy forms.

The contractor is permitted to separate his payroll according to labor classification. For Premises and Operations coverage payroll is used as the base of establishing premium. It's important, as for Workmen's Compensation, to keep accurate payroll records.

The rates for General Liability vary by classification and somewhat by state. The two sets of rates under each coverage of general liability provide for bodily injury liability and property damage liability. Commonly referred to as B.I. and P.D., these rates are spelled out on your policy at the beginning of the policy year. General liability is not usually subject to strict state bureau controls as workmen's compensation. Of course, the limits of liability you choose to carry is an important rate factor. Separate rates are used for each coverage; the exception is when you have combined all rates into a "composite rate."

Payroll limitations are similar to Workmen's Compensation. Check the states and their applicable limitations.

Contractors' Protective coverage premium is based upon contract cost. Completed Operations is based upon total receipts. Contractual liability premium depends upon the kind of "hold harmless" agreement you have signed.

Certificates of insurance from any "subs" should specify their liability coverages.

If your general liability premium is combined with your Workmen's Compensation for retrospective rating, a separation of rates will be shown on the policy. The proper part of rate to be included under the retrospective rating should be so designated on your audit. Make sure.

### Automobile Insurance

Three areas of the automobile



## OVERMAN

### STONE AND ASPHALT SPREADER

#### A BIG-JOB PAYER AT A SMALL-JOB COST

You can do fast, high-quality paving with this small, compact, low cost machine. Lays any type commercial asphalt. Easily handled on small jobs highly efficient on the largest job. A proven money-maker for contractors and highway departments everywhere.

GET THE FACTS . . . WRITE FOR DESCRIPTIVE BULLETIN TODAY

**I.J.OVERMAN MANUFACTURING CO.**  
**BOX 896 MARION, INDIANA**

...for more details circle 328 on enclosed return postal card

policy cover three distinct exposures—each of which is important — (1) Owned Automobiles (and trucks) (2) Hired Cars (and trucks) (3) Non-Owned Automobiles. Don't overlook fleet and premium discounts if applicable.

The owned trucks are rated by type of work (road construction), weight, territory of operation, and limits of liability. Owned private passenger cars are rated by use, territory and limits of liability. Drivers under 25 years old may also affect the rates. Under fleet policies the auditor should check additions and deletions during the year.

Hired Car coverage is designed to provide you with protection while a hired car or truck is under your direction. If the hired trucker does not carry automobile liability coverage, your rate is 20 times higher! Again, make sure to get an insurance certificate. Without it the auditor must assume you are providing liability protection from the first dollar on the hired vehicle. Evidence of a basic policy will reduce your premium by 95%. Hired car rates are based upon the total cost of hire.

Non-Owned Automobile coverage provides protection for you in excess of basic policies of your employees. Rates are divided into two categories— Class I and Class II. Class I persons are those who normally use their own automobile while working for you—such as a salesman. Class II employees are all others such as your secretary who may occasionally run an errand. The rates are considerably higher for Class I employees. Be sure yours are properly classified.

The audit offers you, as well as your insurance company, a concise picture of many facts about your operations. Accurate records and a workable understanding of what you are paying for is simply "good business." It's a cinch the insurance auditor can't give you credit for something that you don't show him.

CANADA'S FIRST SEMINAR on highway management will be a feature of the Canadian Good Roads Association's 42nd annual convention. The seminar will be held at Banff, British Columbia, September 3-8, the week preceding the convention.



EIMCO 126 FRONT END LOADER

**Before you buy your next Front End Loader,  
ask yourself these questions:**

"Is it really the best?"

"Am I habit-buying my crawler equipment?"

"Are my maintenance costs satisfactory?"

"Do I **know** I can't do better?"

To make sure you have the answers, check the quality-crafted Eimco series of diesel-powered Front End Loaders and Excavators. Engineered and built by the world's largest, most successful builder of loaders for tough, rough underground rock loading, any Eimco will outproduce, outload, outmaneuver and outlast any other crawler unit in its class. We've got the facts to back these claims! Write The Eimco Corporation, P.O. Box 300, Salt Lake City 10, Utah, U.S.A. for the Dealer or Branch nearest you and for Bulletin LS-1097.

The **EIMCO** corporation

Head Office: Salt Lake City 10, Utah, U.S.A.  
Export Office: 52 South St., N.Y.



"Advanced Engineering and  
Quality Craftsmanship  
Since 1884"

B-725

# NEW PRODUCTS

Listed here are reviews of new and improved equipment items, selected to aid our readers in purchasing. See reader service numbers on enclosed postcard.\*



The three components of the Erie Mobile Central Mix Plant—one man operation and two days dismantle-to-erection time.

## Mobile Central Mix Concrete Plant

A new fully mobile central mix concrete plant that is mounted on its own running gear and can be easily towed to job locations by truck tractors, has been introduced by the Erie Strayer Co., Erie, Penn.

The unit, known as the Erie Mobile Mix Plant, consists of an aggregate batching unit, cement batching unit and a mixer. With a rated maximum capacity of 215 cu. yd. of mix per hr. the plant can be dismantled at one location, moved to another and returned to operation

within two 8 hr. days. Designed as a one man operation, the heart of the device is the mobile trailer with its elevated discharge design permitting a low-to-the-ground operation. The mixer control panel, water meter and 500 gal. tank, air compressor, hydraulic unit and the power entrance panel are all mounted on a special lowboy trailer. The unit which has a rated capacity of 6.2 cu. yd. and 10 percent overload, was developed by Glenway Maxon. The tilting type mixer has a fixed charg-

ing chute, which eliminates the maintenance and leakage.

The aggregate batching unit consists of a 100 cu. yd. hopper and a batching section complete with 48 in. high capacity belt conveyor. Divided into 3 compartments, the bin has 2 end compartments with a heaped capacity of 33 cu. yd. each and a center compartment with a heaped capacity of 34 cu. yd. The one piece hopper has its own lifting lugs and running gear. Three sets of tandem clamshell charging gates and a 7 cu. yd. aggregate batcher with an automatic scale are included as part of the batching section. The cement batching unit consists of a cement batching bin and a 600 bbl. capacity ground storage silo. The 8 ft. sq. bin has a 425 bbl. capacity and is equipped with an aeration system, high and low level indicators, running gear and a 49 cu. ft. cement batcher with an automatic scale system. A vertical screw conveyor and air loading system elevates and recirculates materials to a holding hopper of 75 bbl. capacity, located directly above the batcher. An automatic overflow arrangement returns excess cement to the main bin or to the 11 ft. dia. ground storage silo.

Erie Strayer Co., Geist Rd. & NKP RR, Erie, Penn.

For more details circle 101 on Enclosed Return Postal Card.

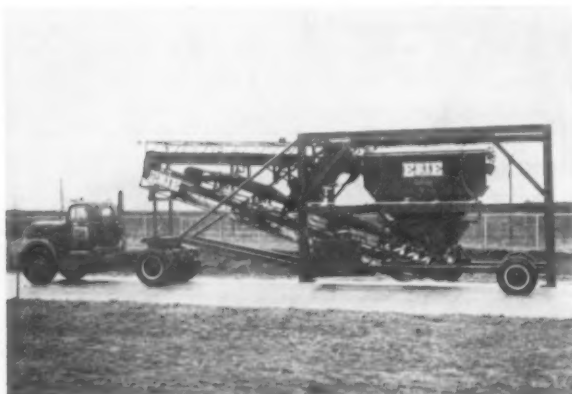
## Cold Mix Epoxy

A new epoxy cold mix coating— asphalt concrete—that can be applied with conventional equipment has been announced by Protex-a-Cote, Inc.

The manufacturer states that new material called Jet Top is ideal for use in the construction of modern air fields, topping for bridge decks. The admixture is effected at the job site in a simple mixing operation in any volume to produce the binder which, with graded and selected aggregates, is manufactured into the tough but flexible concrete topping.

Protex-a-Cote, Inc., 251 Grove Ave., Verona, N. J.

For more details circle 102 on Enclosed Return Postal Card.



The Erie units are portable via their own wheels and can be moved by truck.

\*To readers outside of the United States—postal rules forbid use of business reply cards outside of the U.S. Please write to us listing the numbers, month and name of magazine, and mail with your name and address to Inquiry Dept., Roads and Streets, 22 W. Maple St., Chicago 10, Ill., U.S.A.





Re-Usable Concrete Bags contain aggregates, water and cement.

### Re-Usable Concrete Bags

A large producer of sand and gravel and ready-mix concrete has developed a large, reusable bag for the handling of cement and concrete aggregates.

The present models contain coarse aggregate, fine aggregate and water in one compartment and cement completely sealed off from moisture in a second compartment. The capacity of the bag is  $1\frac{1}{2}$  cu. yd. or about 6,100 lb. The bag is re-usable and the company reports that it may be re-used 800 to 1,000 times before replacement. The bag is so constructed that it may be lifted by any average lifting device normally found in the field or yards of a construction sight. The bag is transported by truck or flat-bed and dumped off in the usual manner, causing no reported damage to the bag or its contents. Mixing is completed at the job sight by whatever means prevails.

Rodeffer Industries, Inc. 965 N. Fair Oaks Ave., Pasadena, Calif.

For more details circle 103 on Enclosed Return Postal Card.

### Lightweight Self-Priming Pump

The development of an all new lightweight self-priming contractor pump was announced by Essick Mfg. Co.

Rugged construction with all wearing parts reinforced, these new  $1\frac{1}{2}$  in. pumps feature compactness and ease of portability. Engineered for long life with minimum maintenance under extremely difficult pumping conditions, this model has an exclusive convert-a-seal feature that allows conversion from general pumping to special application pumping with no castings to change. The priming operation is controlled by natural hydraulic action. This design requires no valves or priming ports to

accomplish the priming cycle, and results in fast priming with highest operating efficiency. One piece aluminum casing are used in the construction of



Essick Self-Prime Pump

these pumps to avoid leakage in internal joints or gaskets. These pumps are available on steel skid base or semi-pneumatic tires.

Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.

For more details circle 104 on Enclosed Return Postal Card.

### Stop Leaks

A liquid chemical additive, Flexcite that makes a fast-acting leak-stopper out of ordinary cement, is now available.

Flexcite reportedly regulates the setting of Portland Cement, making it possible to stop direct leaks instantly. It is excellent for pointing up spalled areas or reforming exposed reinforcing bars or beams. Weather used as a leak-stopper or a plaster coat, Flexcite mortar works equally well on concrete masonry or brick surfaces.

Flexrock Co., 3684 Cuthbert St., Philadelphia 1, Penn.

For more details circle 105 on Enclosed Return Postal Card.

ROADS AND STREETS, May, 1961

## POKER? Play to win!



### How would you play this hand?

Not strong, but play it. Two times in three you'll be high hand before the draw. Raise to drive out pairs. Then stand pat. It's 12 to 1 you couldn't fill anyhow, and it helps set up later, better hands.

### Here's a sure winner from FORD:

New Ford 4000 Heavy Duty Fork Lift! Strength, stability and big-tire traction for fast, safe materials handling on rough terrain.

4000 lbs. rated load at 24" load center. Conforms to or exceeds all Fork Lift Industry stability and capacity recommendations.

Five basic models with 10' to 21' lift heights. Two and three-stage telescoping masts with unusually low collapsed heights. Especially built for rough terrain. Its mobility and low collapsed mast height adapt it for work in many areas with low doorways and narrow aisles.

Get details from your Ford Tractor Dealer, or write:

Tractor and Implement Division  
Ford Motor Company  
Birmingham, Michigan



...for more details circle 310 on enclosed return postal card



The new 105 hp. model 145-T motor grader introduced by Allis-Chalmers expands their line of motor graders to five models.

## New Medium Weight Motor Grader

A new 105 h.p. 145-T motor grader was introduced by Allis-Chalmers construction machinery division at the "Power Parade" press and sales meeting held in Springfield, Ill.

A fifth addition to the motor grader line, the company declares that it was developed to meet performance and specification needs in all geographic areas, at all altitudes and under all working conditions.

The 145-T is a medium weight motor grader. The power plant is the new turbocharged 7000 series engine. It promises high fuel economy, easy starting and quick response, clean exhaust, and cool running. Weight of the 145-T is 21,640 lb. Introduction of the new unit gives Allis-Chalmers a five-model motor grader line, ranging from a 58 hp. model D to the 127 hp. model 45.

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

For more details circle 106 on Enclosed Return Postal Card.

## Cleans Catch Basins or Underground

The release of a new, larger model Elgin Eductor . . . the model 2-M has been announced by Elgin Sweeper Co., Elgin, Ill. The major feature of the 2-M model is a 2,000 gal. tank which will result in an increase in material capacity in doing its catch basin and underground cleaning work. In addition, it will increase the capacity for street flushing, fire-fighting, sewer back flushing and insect spraying, reports Elgin.

The educting method has been reported successful in cleaning undergrounds and catch basins in minutes, whereas unpleasant, unsanitary, hand-

and-bucket methods often run into hours.

The Elgin Corp., 222 West Adams St., Chicago 6, Ill.



Elgin's Underground Cleaner with Sprayer Attachment

For more details circle 107 on Enclosed Return Postal Card.

## Line Roller Spray Machine

The gravity-fed line roller, the Florline Marking Machine, has now been



Florline Roller-Sprayer Machine

combined with a spray machine to make a multi-duty "Two-or-One" unit. The unique device is really two independent machines that may be used separately or in combination with each other.

The 5 gal. machine rolls safety or parking lines with no mist hazard to cars or stock; makes lines flush to barriers and vertically up curbs or walls, states H. C. Sweet, manufacturer. The companion unit is composed of a 3 hp. Briggs and Stratton engine, piston-type compressor and spray gun. It is reported capable of spraying curbs, posts, parking barriers, stencils and serves as portable compressor for other painting needs.

Capable of being a one or two man unit, it may be separated easily or used as a one-man operated team, increasing time saved and labor.

H. C. Sweet Co., New Hudson, Mich.

For more details circle 108 on Enclosed Return Postal Card.

## Loader Attachment

A new loader assembly for the 4 wheel drive, 4 wheel steer "Crab" Tractor is being manufactured by Napco Ind.

Capacity of the new loader attachment is 1 cu. yd. with an added breakout feature of 10,000 lbs. The unit has a high dump clearance—9½ ft. Its reach in dump position at 7 ft. is 4 ft. 9 in. The Napco "Crab" loader has a lift speed of 5½ seconds; drop speed is 4



Napco Loader

seconds; and dumping speed 2½ seconds. Total loader-tractor working weight is 11,950 lbs. The loader cuts working time on all types of digging, dozing, loading, hauling and lifting operations states Napco. Operator fatigue is lessened, and efficiency increased because of the units simple and conveniently located operating controls.

NAPCO Industries, Inc., 7th St. & North Lyndale, Minneapolis 11, Minn.

For more details circle 109 on Enclosed Return Postal Card.

## Inplace Self-Propelled Mixer

A new self-propelled, inplace soil stabilization machine has been introduced by the Road Machinery Div. of Bros. Inc., Minneapolis, Minn.

Called the Bros model SPRM-84 Roto-Mixer, it is heavy-duty machine for mixing, blending, aerating, and pulverizing windrowed and subsurface materials to maximum depth of 10 in. Mixing and blending of windrowed



Self-Propelled Mixer

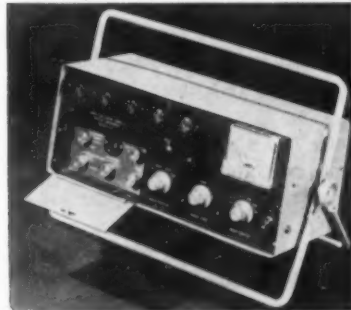
gravel materials is accomplished at rates of 3,000 to 5,000 cu. yds., per hr. Subsurface mixing of scarified materials is done at rates up to 1,000 cu. yds. per hr. The machine's forward speed is accomplished by a unit dual pump driven from the engine crankshaft; the oil goes to selector valves that control the transmission hydraulic motor speed, depending upon need. In this way, one or the other or both unit pumps drive the motor, producing 12 close arranged forward and 3 reverse speeds. With this system, a minimum of HP is required for forward movement, permitting almost all of the engine HP available to the power takeoff that drives the mixing Rotor.

Bros. Inc., Road Machinery Div., 1057 Tenth Ave., S. E. Minneapolis, Minn.

For more details circle 110 on Enclosed Return Postal Card.

## Moisture/Density Machine

The Testlab Corp. has announced the availability of an improved system for determining percent moisture and density of soil by nuclear methods. This equipment, while adaptable to a wide range of uses finds its largest present demand in compaction control and study of soil moisture and density



Testlab Moisture/Density Machine

conditions prior to highway and dam construction, reports Testlab.

The complete system is comprised of a counting unit and a moisture and/or density probe containing a radioactive material and detector system. Measurements are made by inserting or placing the probe on the material being tested and making a reading on the portable scaler.

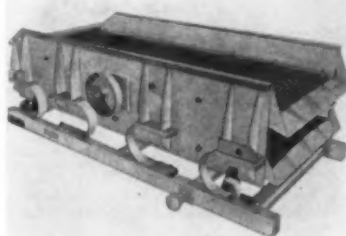
Testlab Corp., 3398 N. Milwaukee Ave., Chicago 41, Ill.

For more details circle 111 on Enclosed Return Postal Card.

## Larger Screens

Screens are now available in a great number of new and larger sizes, according to an announcement recently made by Kolman Mfg. Co.

Single deck and double deck screens up to 14 ft. long and 72 in. wide are now being produced. Triple deck screens are made in sizes up to 14 ft. long and 60 in. wide. Features of Kolman Screens include a light and compact design requiring a minimum of horsepower. A vigorous vibrating action produces large capacities. High



Kolman Screens

speed operation makes Kolman screens especially effective for fine screening. Accessories for these screens include spray bars, ball trays and screen heaters. Vibrating grizzlies are also available now in the Kolman line, as well as complete aggregate washing plants employing either single screen units or tandem screens.

Kolman Mfg. Co., Sioux Falls, S. D.

For more details circle 112 on Enclosed Return Postal Card.

## Center-Mounted Derrick

A center-mounted derrick for the utility field that can be operated from a rotating crow's nest is now being made by the Holan Corp.

The Holan 7700 Hydraulic Derrick can be easily mounted on the chassis at any point behind the cab and requires only 18 to 26 in. mounting space, depending upon the mounting and jack choice. The derrick—including the base, superstructure and hydraulic out riggers—is built as an integral unit to minimize body and derrick stresses. Seated in the crow's nest, the operator has an unobstructed view of his work area and can dig, "live boom" up to 9,000 lb., rotate 360 deg. in either direction and extend and retract the

7-ft. boom. Foot pedal controls rotate the derrick and operate the digger; the derrick vertical movement and



Holan's Rotating Derrick

boom extension and retraction operations are controlled by hand levers.

Holan Corp., 4100 W. 150th Street, Cleveland 35, Ohio

For more details circle 113 on Enclosed Return Postal Card.

## One Yard Shovel

The newest addition to the Unit line of power cranes and excavators is the model 271-C, a 1-yd. shovel which can be converted to dragline, trencher, clamshell liftcrane, and magnet crane front ends.

Among the new features is the compact swing circle gear assembly with upper works mounted on a large diameter, double live ring of steel balls running in hardened races. A friction-free, fast swing is the result, and with the center pin mounting, hook and turnable rollers, and roller path eliminated, there's practically no day-to-day lubrication or maintenance required. Swingers run in a bath of oil which is kept cool by a set of copper coils connected directly to the

Unit 1 Yard Shovel Dragline

radiator cooling system. Thermostatic control holds temperature below the point where clutch lining life is normally affected by heat. Other features include: one-piece main machinery case; automatic traction brakes; straight-in-line engine mounting; full vision cab; disc-type clutches; and involutesplined shafts in upper works and crawlers.

Unit Crane & Shovel Corp., Milwaukee, Wis.

For more details circle 114 on Enclosed Return Postal Card.

ROADS AND STREETS, May, 1961

155





## Modern sports stadiums... modern CF&I Steel Products

Tomorrow's sports arenas, many now on the drawing boards, will differ vastly from anything in existence today. Using new construction techniques and new construction products, contractors will erect a girderless stadium with an unobstructed view from any section — a stadium with a retractable roof that allows contests to be played in any kind of weather.

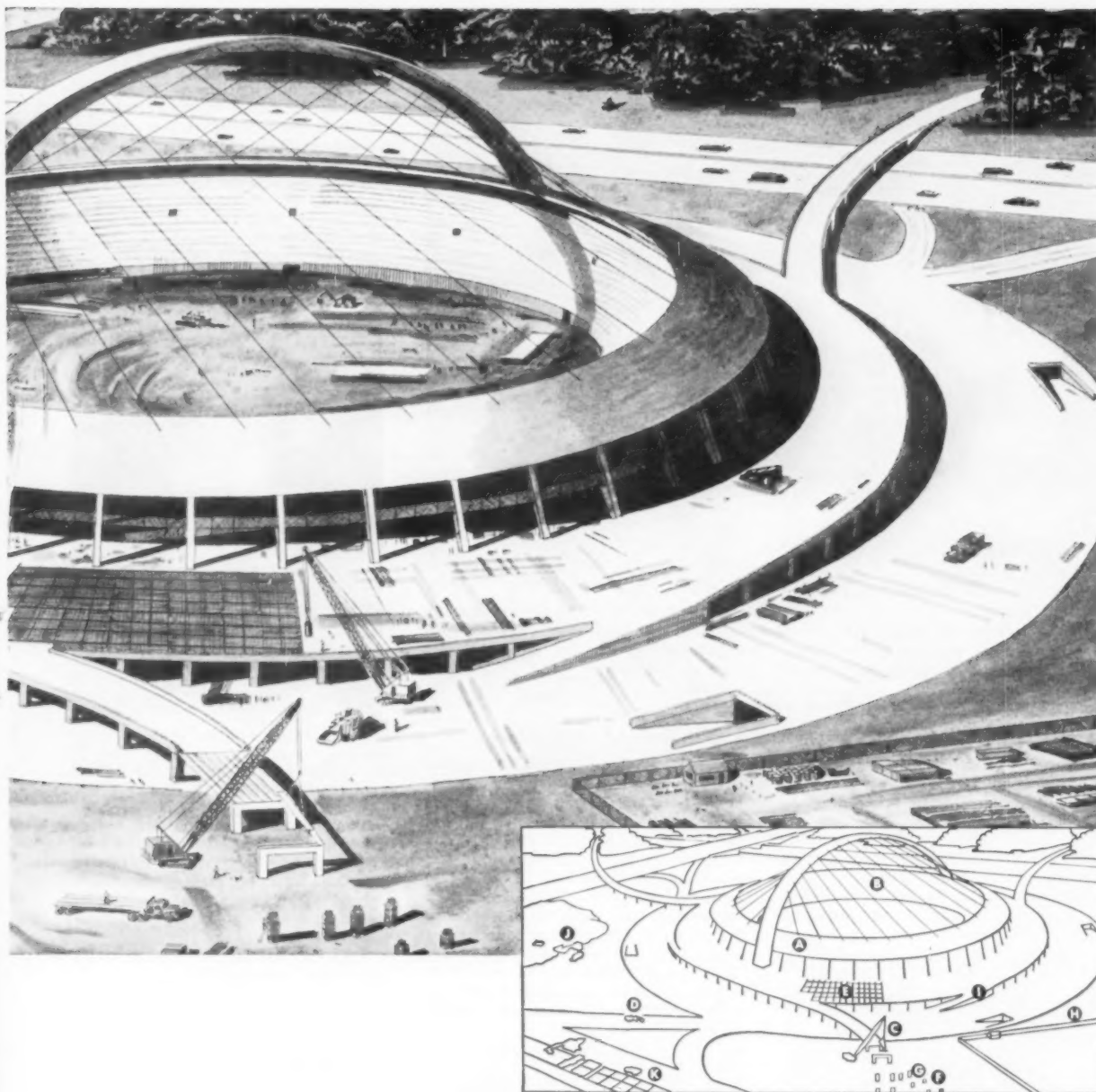
CF&I—a nationwide steel company—provides many different steel products for all types of construction, including sports stadiums like the one shown above.

*CF&I Prestressed Concrete Strand and Wire (A)* give the necessary tensile strength to precast concrete beams used in the grandstands of the stadium. These lightweight beams are also widely used in the underground parking area and the ramps leading to the stadium.

*CF&I-Wickwire Wire Rope (B)* could be used to support the transparent plastic roof which folds like an accordion at the arch. For more standard construction uses, CF&I's premium wire rope, Double Gray®-X, gives extra-long life because its wires are protected by a molecular shield of molybdenum disulphide. And *CF&I-Wickwire Wire Rope Slings (C)* are selected for safe, dependable hoisting.

*CF&I Grader Blades and Cutting Edges (D)* change hard, rocky ground into smooth roadbeds. *CF&I-Welded Wire Fabric (E)* provides steel reinforcement for concrete in main highways, access roads, parking areas and tilt-up constructions, giving them longer life and smoother surfaces. *CF&I Rebars (F)* strengthen the concrete columns which support the ramps leading to one of the





three-tier parking areas. And *CF&I Cal-Tie Wire (G)* in convenient belt-borne reels, permits safe, fast, economical tying of the rebars.

For maximum security of material and equipment stored outdoors, the contractors choose an easy-to-install *Realock Chain Link Fence (H)*. It is widely used around parking fields and to control the stream of traffic from the parking areas to the stadium. In addition, Realock Fence is used to separate grandstand sections and is ideal for crowd control along overhead ramps and walkways.

Thousands of pounds of *CF&I Nails (I)* are used for

wooden scaffolding and concrete forms, while much of the gravel and aggregate is sized on *CF&I Industrial Screens (J)*. And *CF&I-Wickwire Automotive Springs (K)* are extensively used in trucks and service vehicles.

More and more contractors now realize that a domestic steel company—like CF&I—is best equipped to supply them with dependable steel products and expert on-the-job technical assistance. For complete details, contact a nearby CF&I office or write for Catalog G-104 "CF&I Steel Products for the Construction Industry."

## THE COLORADO FUEL AND IRON CORPORATION

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Sales Offices In All Key Cities

...for more details circle 288 on enclosed return postal card

ROADS AND STREETS, May, 1961



0111



Nearly 1,000 dealers and press people sat in a grand stand in Springfield, Illinois recently to watch this experimental Allis-Chalmers dual engine motor scraper being put through its paces. Powered by two 340 hp. Allis-Chalmers diesel engines, the giant has a capacity of 40 cu. yd. and a speed of 30 mph.

For more details circle 115 on  
Enclosed Return Postal Card.

### Trash Pumps

New self-priming centrifugals that pump big volume and also positively eject trash have been announced by Jaeger Machine Co.

Designed to handle any dewatering job, these new Jaeger trash pumps feature an exclusive "Posiflector" that assures positive ejection of debris when pumping dirty water. It channels trash directly into the pump's



Jaeger's Trash Pump

discharge flow, prevents recirculation of solids larger than 1/4 in. The pumps have a heavy 2-bladed impeller that passes large diameter solids, and a big-opening strainer that handles sticks and leaves without clogging. In addition, the entire suction chamber can be removed quickly and easily for periodic cleaning and inspection or adjustment of liner plate and impeller.

Jaeger Machine Co. Columbus 16, Ohio.

For more details circle 116 on  
Enclosed Return Postal Card.

### Light-Weight Trencher

A new light-weight portable trencher is being marketed under the name of Digz-All by the Wind-King Mfg. Co.

The unit weighs 345 pounds and will dig a trench 3 in. wide with any depth to 32 in. Depending upon soil conditions, the Digz-All will dig one to ten or more ft. per min. It is designed to provide fast, economical trenching for pipe and utility lines, foundations and footings. It features a welded box steel boom which may be raised to vertical position for easy storage or transportation. Overall length of the



Digz-All Trencher

machine is 57 in. with the boom raised. Overall height to the top of the engine is 35 in., and 29 in. wide. It is equipped with a 4 hp. Kohler or Clinton cast iron engine with oil bath air cleaner.

Wind King Mfg. Co., Merrill, Iowa

For more details circle 117 on  
Enclosed Return Postal Card.

### Traffic Cone Markers

Traffic cone markers in bright fluorescent red for high visibility, and made of one-piece rotationally-cast plastisol for longer life, have been introduced by Jobet Industries, Inc.

The manufacturers reports that Jobet cones are almost impossible to tear or cut and are also resistant to gasoline, oil tar and paint, which can be cleaned off. The plastisol is especially formulated for cold weather use. Jobet cones are 18 in. high, tapering from a 2 1/4



Jobet Traffic Cones

in. top dia. to 8 in. bottom dia. on all 11 in. square base; 28 in. cones are also available.

The fluorescent red has the ability to reflect light. If lighted from within, the brilliant red cone can be seen from distances, making them ideal lighted markers for safety islands, drive approach areas, airport taxi and loading areas.

Jobet Industries, Inc., 547 W. South Park Ave., Oshkosh, Wis.

For more details circle 118 on  
Enclosed Return Postal Card.

### Self-Priming Pumps

The addition of two new units to their "Torrent" line of self-priming, portable pumps has been added by the Hale Fire Pump Co.

The new units, the 40-T "Torrent" and the 41-T "Torrent" are both trailer mounted on pneumatic tires for easy towing and can be moved to location for quick de-watering jobs.

The 40-T pumps 40,000 gph and the 41-T pumps 30,000 gph. Both units automatically reprime. There are no check valves, no priming. In addition to priming feature, rugged construction and simplicity of design make these pumps valuable for continuous pumping in difficult conditions.

Hale Fire Pump Co., Conshohocken, Pa.

For more details circle 119 on  
Enclosed Return Postal Card.

## 23 Ton Capacity Lift Truck

The demand for a maneuverable, top-performing lift truck capable of handling loads in the 46,000 lb. capacity range, has been met in the Challenger 460A . . . newest addition to Hyster's pneumatic tire lift truck line.

Rated at 23 tons at a 48 in. load center, the unit will find its biggest acceptance by customers in the heavy construction, and steel, pipe concrete



Challenger 460A

logging industries. The Challenger 460A incorporates many of the features and refinements found in the Challenger 360-400 Series. Two features stressed are an exclusive full time, full flow oil filter, and a dry type air cleaner with precleaner. The full flow filter is located at the return tube in the hydraulic tank where all oil must pass through.

Hyster Co., P. O. Box 847, Danville, Ill.

For more details circle 120 on Enclosed Return Postal Card.

## Concrete Mortar Penetrometer

A new pocket style concrete mortar Penetrometer for field and laboratory evaluation of the "initial set" of concrete has been developed by Soiltest, Inc. The penetrometer is designed for use by engineers, contractors, consul-



Soiltest's Penetrometer

ants, testing laboratories, cement and concrete plants, highway departments, and governmental agencies.

The penetrometer which is only 7 in. long can be used in conjunction with ASTM test C-403. The test procedure involves forcing the  $\frac{1}{2}$  sq. in. steel penetrometer shaft into concrete mortar to a depth of one in. scribed on

the shaft. The resistance in 16 lb. per sq. in. is shown on the penetrometer's direct reading scale by the indicator sleeve which automatically holds its position until released. The scale range to 700 lb. per sq. in.

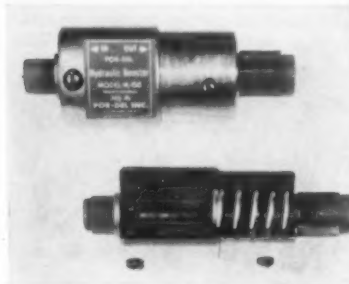
Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill.

For more details circle 121 on Enclosed Return Postal Card.

## Hydraulic Power Brake

Safer and easier stops with less foot-pedal effort, substantially improved braking power, and better control of brake "fade", are features of the recently announced Por-Del Hydraulic Power Brake.

Designed to maintain a high degree of efficiency for braking systems, the small, trouble-free safety unit attaches remote or directly to the existing master cylinder, and provides improved braking even on systems already using vacuum-type power brakes. The new unit is completely self-activating, working with engine on or off, and features simplicity, extreme ease of installation, and little maintenance costs.



Por-Del's Hydraulic Power Brake

The manufacturer reports that the new unit provides the driver, in the interest of safety, with better control of his vehicle. The low-speed "grabbing effect" has been reduced, and at higher speeds, a more perfect and reliable braking "feel" and control is achieved.

Por-Del, Inc., P. O. Box 1566 Dept. 313, Escondido, Calif.

For more details circle 122 on Enclosed Return Postal Card.

## Heavy Fluids Pump

A 10 to 1 ratio pump for handling heavy fluid materials has been developed by Binks Mfg. Co. to meet the need for a low-cost but powerful pump.

A newly designed air motor valve provides high pumping rates with minimum back pressure. A muffler on the exhaust reduces operation noise. The Binks 10 to 1 pump is air operated, and designed to deliver fluid on both the up and down pumping strokes, for smooth flow of material. A surge control is available.

Binks Mfg. Co., 3114 Carroll Ave., Chicago 12, Ill.

For more details circle 123 on Enclosed Return Postal Card.

# NEENAH

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## NEENAH

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a daily production capacity of 500 tons in our two plants,



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5445 North Neva Ave., Chicago 31, Ill.

... for more details circle 327 on enclosed return postal card

## Tailgate Loading Curber

A new mounted-on-tailgate loader for curbing machines is being manufactured by the Miller Spreader Corp. Youngstown, Ohio. A key feature in the design of the unit is a helicoid spiral feed screw, 6 in. dia. and ten ft. long, which runs the full length of



Miller's Curbing Machine

the machine and feeds material from the hopper, to the point of application.

The Miller curb loader is mounted on the dump truck tailgate with 3 hooks on chain-type cables. It can be easily transferred from truck to truck in 3 min. When not in use it stands independently on collapsible legs at tailgate height. There are three shut-off controls—at right and left ends of the truck tailgate and forward on the truck body near position where a worker guides the curber.

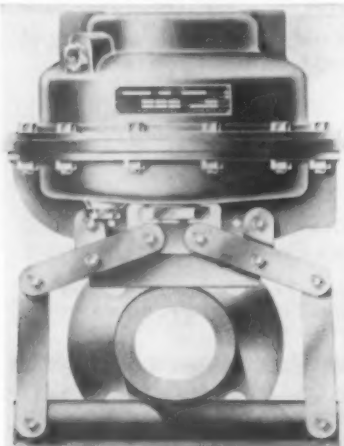
Miller Spreader Corp., 4020 Simon Rd., Youngstown, Ohio.

For more details circle 124 on Enclosed Return Postal Card.

## Automatic Flex Valve

A "ful-flu" Flex Valve to control highly abrasive slurries and corrosive materials in locations considered too hazardous or inaccessible for manually operated valves is now available from Farris Flexible Valve Corp.

The automatic Flex Valve has a simple pipe-like body which provides full



Flex Valve

capacity and unobstructed flow. It will not plug, states Farris. Anything that

flows through a pipe will flow through this Flex Valve. It closes bubble tight even on small solids. Its smooth bore minimizes incrustation, permitting easy cleaning by tapping with a mallet. The flexible body absorbs vibration and is unaffected by water hammer. It will not freeze in outdoor service. The Flex Valve is very durable continues a statement by the manufacturer. A diaphragm motor permits automatic control. It is available in a range of body materials including pure gum rubber, Buna-S, Buna-N, neoprene and butyl or compounds of each. Sizes range from 1 to 12 in. Connections include slip-on and flanged types.

Farris Flexible Valve Corp. 400 Commercial Ave. Palisades Park, N. J.

For more details circle 125 on Enclosed Return Postal Card.

## Mobile Drop Hammer

A mobile drop hammer has been added to the line of earth moving equipment produced by Henry Mfg. Co.

The model DH-8 drop hammer is designed for mounting on various makes and models of utility tractors in combination with Henry loaders. The



Henry's Drop Hammer

striker weighs 1,000 lbs. and will produce up to 8,000 ft. lb. of impact. The striker and mast may be shifted hydraulically for a total lateral movement of 5 ft. The model DM-8 operates by hydraulic power and features an electronic control for automatic cycling. Control of the unit may be either automatic or manual. The DH-8 may be used for breaking concrete, cutting asphalt or tamping back fill. Special tools are available for these purposes. Literature with complete specifications is available from the manufacturer.

Henry Mfg. Co., Box 521, Topeka, Kansas.

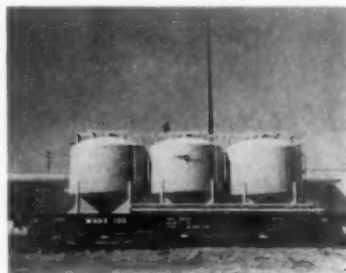
For more details circle 126 on Enclosed Return Postal Card.

## Pneumatic Railway Car

A pneumatically operated tank railroad car for hauling and transferring

powered, granular and most pelletized dry materials is being introduced by Halliburton Co. of Duncan, Okla.

The 2400 cu. ft. capacity car mounts 3 tear drop tanks on a specially built railway car having 152,000 lb. payload. Each tank holds 800 cu. ft. Halliburton said the car was engineered by its bulk materials handling department.



Halliburton's Tank Car

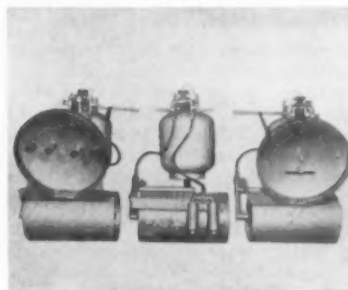
One man can unload the car in 30 min. directly into storage bins, without interfering with plant operations. The car unloads materials anywhere a pipe or hose can be routed. With Halliburton's unique aeration system, the tanks are self-cleaning as each load is moved.

Products Div. Halliburton Co. Duncan, Okla.

For more details circle 127 on Enclosed Return Postal Card.

## Heat Roller

The new Rola-Burner manufactured by Mutual Liquid Gas Equipment Co., provides a combination unit which heats, smooths and compacts asphalt to the desired finish. Operating on clean, fast LP-gas, it is excellent for removing



Rola-Burners

bumps and paint lines and for drying out wet spots.

Besides the heated roller, the unit has an auxiliary heat supply which quickly returns heat to cold asphalt so it can be re-raked or compacted for a long lasting finish. Two models are available: standard, weight 180 lbs. and heavy-duty, weight 207 lbs. Either model can be fitted with one of three burner arrangements.

Mutual Liquid Gas Equipment Co., 17129 S. Broadway, Gardena, Calif.

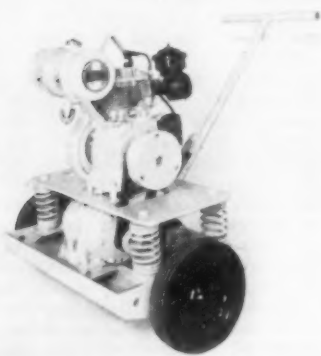
For more details circle 128 on Enclosed Return Postal Card.



## Engine-driven Compactor

A self-contained, engine-driven compactor said to be the most powerful and productive of any on the market has been added to an existing line of manually guided machines by Jackson Vibrators, Inc. Ludington, Mich. It delivers 4200 3-ton blows per min. and is powered by a 7 hp Wisconsin engine.

The operating handle, adjustable to suit the height of the operator, is thor-



Jackson's Compaction

oughly insulated from vibration. Wheels for easy mobility have independent axles and holding toggles which permit them to be attached or detached in a matter of seconds. Bases or pans are available in various widths up to 30 in. wide. The manufacturer claims the machine does not "jack-rabbit" . . . all the energy goes into compacting the soil and specified density is usually achieved in a single pass. A wetting device is supplied to prevent sticking. This machine is also available with a vibratory electric motor of the type that Jackson uses on its roadbuilding compactor.

Jackson Vibrators, Inc., Ludington, Mich.

For more details circle 129 on Enclosed Return Postal Card.

## Engine Generators

A new high capacity series of Winco Engine Generators has been announced by Wincharger Corp. The New "91" series engine generators are specially designed to provide stand-by electric power in the event of power failure.

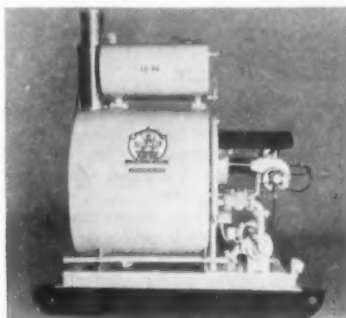
According to the company the new "91" series offers Winco's exclusive Maxi-Watt power control which provides maximum power for heavy motor loads, or maximum efficiency for lights and normal loads. It produces 9000 watts of AC intermittent duty power, or 7500 watts of continuous power. It safely powers a 3 h.p. and a 2 h.p. motor, or a 5 h.p. motor, plus 2500 watts of resistive load on its 230 V. circuit; or two 2 h.p. motors plus 3500 watts of resistive load on its 115 V circuits.

Wincharger Corp., Sioux City 2, Iowa.

For more details circle 130 on Enclosed Return Postal Card.

## Circulating Hot Oil Heaters

The Little Devil is a new low-cost, manually operated circulating hot oil heater. This unit has been developed to provide a high quality heater, at a low cost, for hot mix plants with capacities of 10 to 40 tph, reports Childers Mfg. Co.



Childers Little Devil

It is equipped with button start and stop, electric ignition, high limit shut-off, and temperature regulation by fuel input. The burner uses #1 or #2 light oil, or it is available with a gasoline motor to be utilized when electricity is not available. Fuel input is 2 to 6 gph and horsepower required is 1 1/4. The device is insulated with 2 in. of fiberglass covered with metal skin. Specifications: length 72 in., height 72 in., width 40 in. and has a 70 gal circulating oil capacity.

There is no factory installation service assistance required states Childers.

Childers Mfg. Co., Inc., 2010-6th St. Northwest, Albuquerque, N. M.

For more details circle 131 on Enclosed Return Postal Card.

## Dutch Elm Disease

From the research laboratories of Chemical Insecticide Corp. comes a new liquid homogenized mist spray for control of dutch elm disease.

This formula carries a safe phytotoxicity and toxicological rating as well as a "no flash point". In addition to destroying the scolytus bark beetle which infects the elm, the insecticidal and fungicidal particles rapidly kill mite, aphids, chewing and sucking pests and controls fungus diseases. A special concentrated plant food of nitrogen and salts in the MIST Bio liquid assures healthier trees. Another feature is that 26C OF does not crystallize out of solution even at 20 deg. F. nor does it form a solid, hard-to-redissolve mass in the drum.

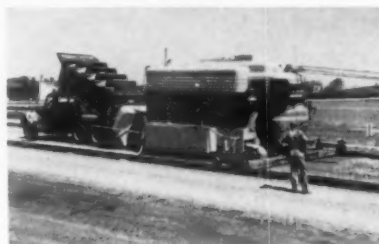
A complete two-page technical data report is available upon request.

Chemical Insecticide Corp., 30 Whitman Ave., Metuchen, N. J.

For more details circle 132 on Enclosed Return Postal Card.

## Another Example of Reduced Maintenance Costs (Performance Study #387)

Until three years ago, Barton Contracting Co., Osseo, Minn., contractor on the Minneapolis-St. Paul Freeway System, had used ordinary grease and oils in their fleet of 80 tandem trucks, asphalt plants, and heavy equipment such as the Rex paver, shown below.



Then, an International 180 Tandem lost its rear-axle plug. With a dry box, noise and overheating, a costly repair job seemed certain. ALMASOL 608 (SAE 140) GEAR LUBRICANT was installed, with no further work on the assembly, and it has run without maintenance and practically no make-up oil for the three years since!

Similarly, serious gear overheating was occurring on Barton's Bucyrus-Erie shovels and cranes, subjected to very heavy operating conditions. ALMASOL 607-608 GEAR LUBRICANTS reduced frictional heat and the need for make-up oil to an absolute minimum!

HERE'S HOW YOU CAN CUT YOUR EQUIPMENT MAINTENANCE COSTS: send today for complete information on ALMASOL 607-608 GEAR LUBRICANTS.

WRITE, WIRE OR PHONE DEPT RS-3



**LUBRICATION ENGINEERS INC.**

Fort Worth 11, Texas

Custom Built Lubricants for Heavy Equipment

LE-61-2



... for more details circle 308 on enclosed return postal card

## Bridge Maintenance

The new Perfection Hi-Lift hoist and special platform body is reportedly providing convenience to workmen and helping to cut bridge maintenance costs—especially in bridge painting and preservation.

With this Hi-Lift hoist, men and materials on the platform can be



Bridge Maintenance

raised any height from truck chassis level to over 12 ft. from the ground. Raising and lowering of the platform is hydraulically controlled from the truck cab and/or body. The wide platform area gives the workmen "sure footing" which speeds up the job and avoids the possibility of personal injuries. Furthermore, the large platform area permits raising and han-

dling large quantities of needed materials without the usual hand-passing encountered in ordinary methods of maintenance.

Manufactured by the Perfection Steel Body Company of Galion, the hoist has a lift capacity of 12,000 lbs. and is designed for use with many body types and designs.

**Perfection Steel Body Co., Galion, Ohio.**

For more details circle 133 on Enclosed Return Postal Card.

## Blaze Orange Safety Vests

A fluorescent blaze orange vest for construction personnel has been developed by the American Optical Co., Safety Products Div.

Made of a plastic impregnated material, the garment is perforated for ventilation and will fit all persons. The vest has white phosphorescent stripes for added protection. Elastic straps on each side and fabric tapes on the front are added for adjustment. AO determined through testing that the orange is the safest color for day and night work. The color attracts maximum attention during the day time. The phosphorescent white stripes give added protection after dark.

**American Optical Co., Southbridge, Mass.**

For more details circle 134 on Enclosed Return Postal Card.

## Heavy-Duty Chassis

Chevrolet has introduced a new heavy-duty chassis option tailored to meet the demands of off-road operations, such as dump work and mining operations.

Available for 2 and 2½ ton models on 157 and 175 in. wheelbases, the heavily reinforced chassis is designed to meet punishing torsional and weight stresses imposed by heavy-load operation over rough terrain. Frame strength and rigidity are increased by heavier gauge side rails and inner liners, and full-length reinforcements. Repositioning of torsion bar anchors to a frame crossmember location minimizes torsional strain. Adding still more strength are tubular cross member and double-gusseted crossmember at the fore and aft rear spring hangers respectively. Another important feature of the new option is use of an alligator jaw type crossmember in place of the conventional "x" center member. The change affords higher frame beam strength and more flexibility for the heavy loads and twisting stresses encountered in most off-road hauling, reports the manufacturer.

**Chevrolet Motor Div., GMC, General Motors Bldg., Detroit 2, Mich.**

For more details circle 135 on Enclosed Return Postal Card.

**LOOK FOR**

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**DRIVES**

on the  
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Draglines and Cranes
Hoisting Equipment
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P.O. Box 577-M  
COFFEYVILLE,  
KAN.

Get smooth, instant power shifting — both forward and reverse, or lift and lower—with JUST ONE LEVER.



Power Shovels



Earth Movers

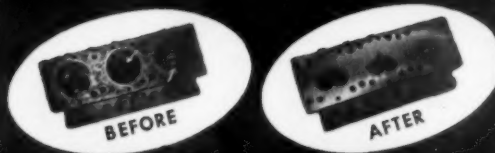


Road Rollers

## DON'T THROW AWAY CRACKED DIESEL CYLINDER HEADS

You can save 50% of replacement cost with Factory Rebuilt Swick-Guth Heads. Swick-Guth restores cracked or worn heads, blocks, transmission cases to a Guaranteed good as new condition by the Controlled Heat Process . . . successfully used for more than a Quarter Century.

**GUARANTEED TO YOUR SATISFACTION**



Send today for price list and a free booklet on the famous Swick-Guth Process, and the name of the dealer nearest you.

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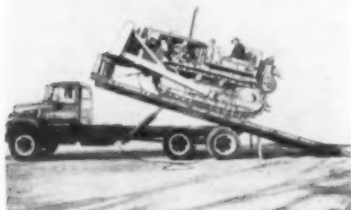


"DIESEL CASTINGS"

## Ramp Hoist

A new model of the ramp hoist, designed for heavy industrial use has been introduced by Schwartz Mfg. Co. This new model, mounted on tandem trucks, will handle loads up to 15 tons.

The Schwartz Ramp Hoist is basically a hydraulically operated platform with a powered winch and cable. In



Schwartz Ramp Hoist.

operation, the platform is lowered in front of the equipment to be hauled. The heavy  $\frac{5}{8}$  in. steel cable is attached to the equipment which is then drawn onto the platform by the hydraulically powered winch. When the equipment is in place, the platform is then hydraulically lowered and the load is ready to be transported. All of the operations are controlled by means of a push-button switch on a 30 ft. extension cord. This gives the operator full view of the loading and unloading operations at all times. This new industrial model of the Schwartz Ramp Hoist is designed to mount on all models of factory tandems or locally installed tandems, 120 in. cab to tandem center or longer.

Schwartz Mfg. Co., Lester Prairie, Minn.

For more details circle 136 on Enclosed Return Postal Card.

## Front End Loader Attachment

A front end loader attachment with  $1\frac{1}{4}$  cu. yd. (SAE rated) capacity is now being offered for the Kwik-Mix Hi-Lifter, according to an announcement from the Kwik-Mix Co., a division of Kochring Co.



Kwik-Mix Loader

The front end loader attachment digs 94 in. wide, has  $8\frac{1}{2}$  ft. dumping

## International's Through-Drive Axles



height, 40 deg. bucket roll back at ground level, 50 deg. at dumping height, and 9,000 lb. breakout force. Maximum lifting capacity is 8,500 lb. One of the outstanding features of the Hi-Lifter front end loader is that the entire front end operating mechanism pivots ahead of the operator. This design provides safety to the operator; he is not bothered by lift arms sweeping up and around him during hoisting cycles. Another feature is the versatility now available with the machine. With its quick-change attachments—standard fork lift able to lift 4,000 lbs. to  $22\frac{1}{2}$  ft.; pallet fork able to lift 3,000 lbs. to 35 ft.; vertical clamp arms for stacked lumber; crane hook; two sizes of concrete hoppers; and a material transfer bucket—one Hi-Lifter can do the job of many machines.

Kwik-Mix Co., 235 W. Grand Ave., Port Washington, Wis.

For more details circle 137 on Enclosed Return Postal Card.

## Tree Removal Methods

A new piece of equipment just placed on the market offers a radical innovation in the way of a low-cost method for removal of problem trees. It permits safe control of the direction of fall of heavily-leaning trees that threaten buildings, power and telephone lines, or other improvements.

Called Trott's Directional Tree Faller, the device also is a new and useful tool in forest fire control, right-of-way clearing and other situations where time or damage could be saved by accurately controlling direction of fall of problem trees. The directional tree faller is manufactured in two sizes. A small model, weighing 51 lbs., will handle trees up to 14-16 in. dia. A larger model will handle the largest and heaviest of problem trees. It weighs 152 lbs.

Tree Faller, Idaho Northwoods Co. P. O. Box 391, Landpoint, Idaho.

For more details circle 138 on Enclosed Return Postal Card.

## Through-Drive Tandem Axles

The introduction of three new through-drive tandem rear axles, has been announced by International Harvester Co.

Increased carrying capacity, simplified design and standardization of components are features common to all three new axles. The three IH-built tandem axles are offered in rated capacities of 30,000, 34,000 and 38,000 lb. Steel spring or rubber load cushion suspension models are available. Lightweight components such as aluminum spring saddles and walking beams are optional.

These new tandem axles, as well as all other IH-built single-reduction and two-speed axles, are being offered with a 100,000 mile or one-year warranty. Through-drive design contributes to performance in a wide range of applications, on and off the highway and at a high and low speeds.

International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

For more details circle 139 on Enclosed Return Postal Card.

## Magnetic Sweeper

A magnetic sweeper with sweeping path of 8 ft. and speed of about 5 mph. is now being offered by W. E. Grace Mfg. Co., 6007 S. Lamar St., Dallas, Texas.

This will pick up any magnetic particles, such as scrap iron, nails, cans. A 5 Kw 120 volt DC generator is driven from the tractor rear PTO. Magnet is strong enough to pick up a 450 lb. plate from a height of 4 in and will pull scrap iron pieces through loose gravel.

The Grace line includes sweepers, pneumatic and sheepfoot rollers, asphalt distributors, heaters, and gravel spreaders.

W. E. Grace Mfg Co., 6007 S. Lamar St., Dallas 15, Texas

For more details circle 140 on Enclosed Return Postal Card.

## Engineer's Level

A new engineer's level announced by Wild Heerbrugg Instruments, has been designed for accuracy and convenience in general engineering work such as roads, bridges, construction, tunnels.



Wild's Level

An exclusive feature of the Wild N-2 is the telescope, which together with the level vial assembly, can be rotated about the optical axis for checking level adjustments quickly. Other features include 24 or 28-power telescope with coated lenses, internal focusing, clamp and tangent screw, tilting screw with leverage, and coincidence-reading tubular level.

Wild Heerbrugg Instruments, Inc., Port Washington, N. Y.

For more details circle 141 on Enclosed Return Postal Card.

## High-Pressure Double-Acting Cylinders

A new, high-quality line of 10,000 psi double-acting hydraulic cylinders with choice of stroke length has been announced by the Precision Hydraulics Div., Owatonna Tool Co., designers and manufacturers of several kinds of hydraulic cylinders and power packages.

The new YDS series cylinders are available in bore sizes of 1½, 2 and 2½ in. with "push" capacities of 8, 15 and 25-tons at 10,000 psi. Cylinders are designed primarily as "push" cylinders but with sufficient "pull" force to return the ram from such work as punching, forming and broaching, where spring return is inadequate. Although not designed for continuous pull duty beyond 3,000 psi, they will withstand 10,000 psi safely on the basis of occasional use reports the manufacturer. Construction features are V-packings, heat-treated alloy steel piston rods ground and polished 10-15 micro finish and chrome plated, metallic rod wiper, heat-treated alloy steel tie rods and nuts, and heavy wall cylinder shell bored and honed 10-15 micro finish.

Precision Hydraulics Div., Owatonna Tool Co., 435 Cedar St. Owatonna, Minn.

For more details circle 142 on Enclosed Return Postal Card.

## Low-Band Mobile Radio

A new 20 watt Low-Band mobile radio set has been announced by Aeronautical Electronics, Inc., manufacturers of Areotron two-way radio equipment. The new set is said to be a high quality unit on Low-Band frequencies and includes the versatility of a three-way power supply.

The new model 7N20/TVR utilizes single unit construction with all operating controls located on the front panel. All 7N20/TVR units have provision for local and remote control and have provision for the simple plug-in installation of "Unicall" at any time in



Areotron Mobile Radio

the field. Unicall is a selective call system which permits sharing of crowded frequencies without interference.

The 7N20/TVR is housed in deep-drawn aluminum cabinet which can be easily mounted on the dashboard of a vehicle or in the luggage compartment. A fully transistorized power supply is incorporated into the design of the set and operates on either negative or positive battery systems. Because of this power supply it operates from 6 volts D.C., 12 volts D.C. and 115 volts A.C.

Aeronautical Electronics, P. O. Box 6527, Raleigh, N. C.

For more details circle 143 on Enclosed Return Postal Card.

Builders of some of the country's finest shovels and cranes of the smaller capacities.

### EXCAVATORS

Crawler, rubber and truck mounted; ½ to 1 yard shovels; 5 to 25 ton cranes.

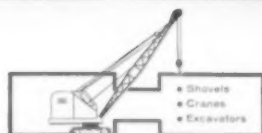
### YARD AND DOCK CRANES

Mechanical and hydraulic, 3, 5 and 6 ton.



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TIFFIN, OHIO

...for more details circle 321 on enclosed return postal card

## Truck Brake Blocks

Expansion of its Velvetouch Feramic truck brake block line to include ½ - ¾ and ¾ in. thicknesses, as well as those of the previously available ¾ in. size, is announced by the S. K. Wellman Co., Bedford, Ohio.

The newly available blocks are especially recommended for light and medium trucks of ½ to 5 ton capacities. They are offered in oversize as well as standard units. Velvetouch Feramic blocks are said to be easy to install, require minimum adjustment and to possess exceptionally long, safe service life. Absence of fade, occasioned by heat, downhill operation, water and high speed, is said to be an outstanding characteristic.

S. K. Wellman Co., 200 Egbert Rd., Bedford, Ohio

For more details circle 144 on Enclosed Return Postal Card.



## Vented Heater

A vented heater designed to supply fume-free, odor-free heat to men working in closed areas has been announced by Champion Heater Co.

Designated as the Model 120-Vented, the new Champion can be used with a stack extension which carries all



Champion's Vented Heater

traces of fumes or odor outdoors, reports the manufacturer. It will maintain a constant supply of clean air and is reported capable of comfortably heating an area equivalent to the size of a six room house. The stack extension, not supplied with the heater, fits over a stub stack on top of the heater.

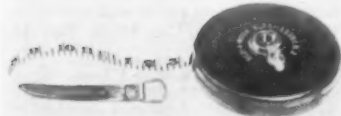
Champion Heater Co., 3700 Forest Park Ave., St. Louis 8, Mo.

For more details circle 145 on Enclosed Return Postal Card.

## Measuring Tape

A line of precision measuring tapes has been introduced by Koh-I-Noor, Inc., producers of drafting materials.

The tapes are precision made in England, and come in top grade leather tooled case, with a precision rewind mechanism. Both metallic and non-metallic, plastic coated woven linen tapes in 50 and 100 ft. lengths are graduated in feet, tenths, and half-



Koh-I-Noor Tape

tenths; also in feet, inches and quarter inches. Special features of the new Koh-I-Noor tapes include a plastic coating that protects the finish and markings permanently against wear and scuffing. It also makes the tape easy to clean with a damp cloth, and renders the woven tape extremely resistant to creasing, crumpling or twisting. The

off-white glare-proof tape finish makes for quicker, easier reading, and the color-coded tongues differentiate between metallic and non-metallic tapes. The latter point is an effective safeguard when there is danger of contact with electrical wiring. Literature describing the Koh-I-Noor tapes is available.

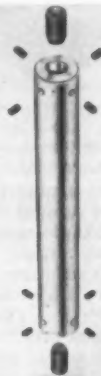
Koh-I-Noor, Inc., Bloomsbury, N. J.

For more details circle 146 on Enclosed Return Postal Card.

## Crawler Track Pins

A new type of master pin for crawler tracks has been introduced by Lempco Automotive, Inc., Tractor Div.

The new Lempco patented pin is said to retain its full strength after being locked in place in the link. The end plugs, when driven in, exert outward pressure on the four small "lock



Lempco's Master Pin

plugs", forcing them to "dimple" locking the master pin securely. End plugs are tapped, may be quickly removed when disassembly is required, by inserting a bolt or cap screw in the tapped hole. When the bolt "bottoms", a few additional turns will back out the plug.

Tractor Div., Lempco Automotive Inc., Bedford, Ohio

For more details circle 147 on Enclosed Return Postal Card.

## Piston Rods With Stud Ends

A new type of piston rod which utilizes a stud end has been announced by the research dept of Hydro-Line Mfg. Co.

Ability of studded rods to endure high speeds and severe side loads is reported to reduce machine downtime and costs caused by cylinder failure. Doubled thread length of the new rod end also will increase manufacturing flexibility during design and assembly. Studded rods are said to eliminate stress concentrations which form at thread reliefs on conventional rod designs.

Research Dept., Hydro-Line Mfg. Co., Rockford, Ill.

For more details circle 148 on Enclosed Return Postal Card.

## 400 Feet Daily



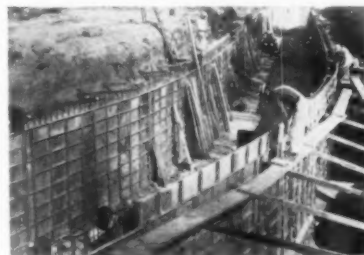
## Extension Brackets and Symons Steel-Ply Forms

... enable contractor to pour at 15c a Square Foot

California contractor, Elmer J. Freethy saved substantially in pouring a channel lining for a flood control project at Pleasant Hill, California. It involved curved walls 9 ft high and 4,000 ft long.

Symons 8 ft Steel-Ply Forms were used with Symons New Extension Bracket, to get the additional foot. In addition to speed, the extension gave the final foot the appearance of a cap on the wall.

Wall specs called for a 1/2" extension joint every 40 lineal feet. The con-



Note extension brackets in foreground and minimum amount of bracing required for curved walls.

tractor had the 1/2" premoulded material cut 3" wider than the wall and used the wall forms to hold it in position. By using a 1" filler on these joints they were able to tie the forms together with long connecting bolts and pour the walls continuously.

Symons Steel-Ply Forms are rented with purchase option.



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#### 9 TUBE MODEL Tube I.D. 4 1/8"

MODEL NUMBER	0930	0936	0942
Size			
13 1/2 x 13 1/2 x L	31	37	43
Inside depth	30 1/2	36 1/2	42 1/2
Price	\$11.50	\$12.00	\$12.50

#### 16 TUBE MODEL Tube I.D. 3 1/8"

MODEL NUMBER	1630	1636	1642
Size			
13 1/2 x 13 1/2 x L	31	37	43
Inside depth	30 1/2	36 1/2	42 1/2
Price	\$12.00	\$12.50	\$13.00

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...for more details circle 293 on enclosed return postal card

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## Coupling Machine

The new Model M700W Hose Coupling Machine recently introduced, incorporates facilities for a complete hose coupling center including a hydraulic powered press and swedging machine; a high speed cut off wheel with re-



M-700W Coupling Machine

servoir for waste, storage drawers for fittings, dies, and tools; all concentrated in and on a cabinet with casters for easy mobility around the premises.

Designed to handle nearly all types of hydraulic, gas, air, oil, grease, and water hose this machine is said to reduce inventory investment and increase range of service. The M-700W is designed with wider press than previous models to permit use of the new sickle section shear. Riveting dies are now available to remove old sickle sections and rivet new ones in place.

Manufacturers Associates, Inc., P. O. Box 349, Perry, Iowa

For more details circle 149 on  
Enclosed Return Postal Card.

## Utility Barricade

The new Esco utility barricade, model EFS 4000 manufactured by Electronics Specialties has been designed for maximum visibility and economy of operation. Its compact construction allows easy handling and hauling, and



Esco's Utility Barricade

reduces usual field damage to a minimum, states Esco.

Among its outstanding features are:

Esco-engineered heavy-duty angle iron legs and cross bar; customer name panel of 6 x 40 in. marine plywood; barricade panel of 12 x 40 in. steel 40 in. leg length. The unit takes one or two lights on theft-proof light mounting. Finished with bake-on high-grade implement enamel the light mounting adapter is included.

Electronic Specialties Co., Batania, Ill.

For more details circle 150 on  
Enclosed Return Postal Card.

## Tractor-Drawn Spreader

The development of the "Chief" tractor-drawn spreader, model TD-100 has been announced by the Henderson Mfg. Co.

The company states the TD-100 features a stainless steel conveyor driven from a hub mounted gear box which provides constant poundage application per acre regardless of the speed of the tractor over the ground. The twin spinners are driven by tractor power takeoff or optional gasoline engine drive. The TD-100 has a capacity of two tons of pelleted and four tons



Henderson TD-100 Spreader

by means of side extensions which are available as optional equipment.

The TD-100 has mounted tandem axles with coil springs. Twin spinners have angle tilt to insure accurate spread pattern of 24 to 30 ft. in width. Cities and counties can use it for spreading chemicals for ice control as well as fertilizer on parks and roadsides.

Henderson Mfg. Co., P. O. Box 50, Manchester, Iowa

For more details circle 151 on  
Enclosed Return Postal Card.

## Reflective Street Sign

A new type of reflective street sign made of one piece extruded aluminum is reported to incorporate a double face blade.

Manufactured by Municipal Street Sign Co., the new signs are known as the Type EA-15. They are finished with "Scotchlite" reflective sign faces.

Municipal Street Sign Company, Inc., 128 14th Avenue, College Point 56, N. Y.

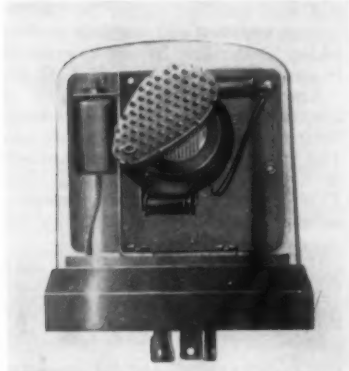
For more details circle 152 on  
Enclosed Return Postal Card.

ROADS AND STREETS, May, 1961

## Varistors In Photo Controls

A new photo control manufactured by Micro Balancing, Inc., promises reliability in automatic switching of street lights.

Compact and lightweight, the new Mark I utilizes a simplified circuit em-



Micro's Varistors

ploying Varistors in conjunction with a secondary lightning arrester. Studies show that transient voltage surges in secondaries, which are below the spark-over of lighting arresters, are the number one source of control failure.

Micro Balancing, Inc., Garden City Park, Long Island, New York.

For more details circle 153 on Enclosed Return Postal Card.

## Traffic Lane Marking System

A new and effective traffic lane marking system providing good nighttime and bad weather visibility has been developed and is being manufactured by the Adhesive, Resin and Chemical Division of the American-Marietta Co.

New lane traffic guide systems are available as a complete package including highly reflective, contoured markers, a high strength epoxy type adhesive for marker-to-pavement bonding, and an efficient semi-automatic application system which is said to insure maximum in-place life and greatest economy. The marker is a low-profile durable plastic disc with impact resistance and flexibility when bonded to the roadway. It contains a uniform dispersion of reflective glass beads throughout which provides exceptional brilliance when exposed to vehicle lights. Because of its consistent composition, the marker remains highly reflective throughout its entire life states the manufacturer. As the grinding action of tires wears it down, new beads continually are exposed to maintain original reflectivity year after year.

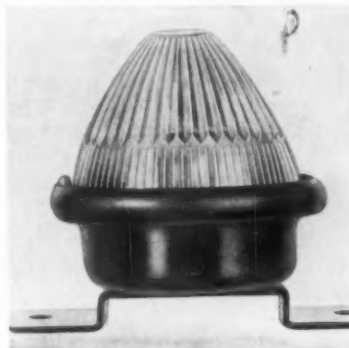
American-Marietta Co., 3400 13th Ave., S. W., Seattle 4, Wash.

For more details circle 154 on Enclosed Return Postal Card.

## Horizontal Safety Light

A new safety light for horizontal mounting on trucks, trailers and tractors has been announced by the Auto Lamp Mfg. Co.

Called the Pathfinder No. CL 671, it has a 2½ in. plastic lens, available



Pathfinder Safety Light

in choice of red, amber, blue, green and clear. The sturdy bracket of heavy-gauge steel is finished in black baked enamel and pre-drilled with two holes for easy mounting. Each light comes complete with wiring and 3 cp. bulb for 6 volt or 4 cp. bulb for 12 volt systems. Catalog sheets are available.

Auto Lamp Mfg. Co., 2909 S. Indiana Ave., Chicago 16, Ill.

For more details circle 155 on Enclosed Return Postal Card.



**THE YEAR'S  
BIG NEWS  
in TRANSITS**

**The Finest  
Contractor's Transit  
You Can Buy... and**

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Contractor's Transit No. 32  
\$460 with tripod

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**SO DURABLE AND RUGGED IT SHOULD REQUIRE  
LITTLE MAINTENANCE DURING A LIFETIME OF SERVICE**

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... for more details circle 340 on enclosed return postal card

**ROADS AND STREETS, May, 1961**

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SUMMIT, N. J.

... for more details circle 303 on enclosed return postal card

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## Equipment Tire Ballast

The development of a dry, inert, pulverized mineral blend to be used as ballast in heavy road equipment tires or tractor tires, was recently announced by "Led" Ballast, Inc.

According to the company, the ballasting material, trademarked "Led" Ballast, provides the equipment operator with a cushioned ride, increased

tire is filled to capacity. Reportedly, in this condition the ballast has the ability to absorb the shock within the tire at the point of impact.

"Led" Ballast, Inc., P. O. Box 265, 2655 Pearl St., Boulder, Colo.

For more details circle 156 on Enclosed Return Postal Card.

## Conveyor Belt

A conveyor belt construction developed for superior resistance to heavy impact, accidental damage and mildew is announced by B. F. Goodrich Industrial Products Co., a division of the B. F. Goodrich Co.

The unique construction is offered for the first time for use on general industrial and overland conveyor systems. Known as "Nylock," the new design features a solid woven body impregnated with rubber and encased with rubber covers. There are no plies of fabric to separate under impact.

The new design is recommended for general industrial use where belt training is difficult, leading to edge damage in conventional belts.

Heavy cables of long-staple cotton are interwoven with high-strength nylon into a single, interlocked nylock unit. The cotton cables provide strength and bulk. Strands of elastic nylon, running in both directions, lock the cotton cables in place and provide additional strength, shock resistance and fastener holding ability. The single

interwoven nylock new construction is flexible, suitable for deep-trough idlers and has fastener strength equal to four plies of 42S fabric, states Goodrich.

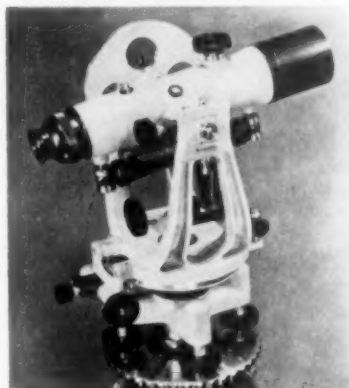
B. F. Goodrich, Akron, Ohio

For more details circle 157 on Enclosed Return Postal Card.

## Contractor's Transit

A new accurate transit for the contractor, architect and engineer has been added to the line by the Engineering Instruments Div. of W. & L. E. Gurley.

Known as the Model Number 287 Contractor's Transit, the new instrument features a telescope 8 1/2 in. long. The telescope transits, swinging through a complete vertical circle. This feature increases the range of vertical angles, makes possible pro-



Model 387 Transit

longing lines and also simplifies checking adjustments. It is possible to read horizontal and vertical angles to five minutes by vernier. The new transit is also useful as a level. The instrument is of U-frame construction and comes with a newly-designed carrying case. Any standard tripod can be used.

All lens surfaces of the 287 are hard anti-reflection coated. Magnification of the telescope is 18 1/2x. A covered glass reticle with cross lines, in dust free focal plane, is a feature of the telescope.

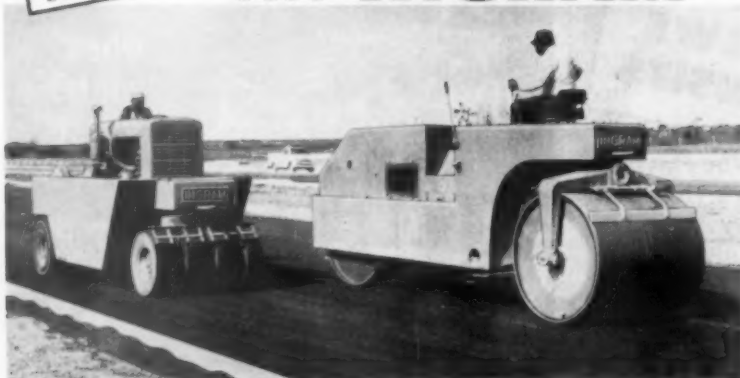
W. & L. E. Gurley, 514 Fulton St., Troy, N.Y.

For more details circle 158 on Enclosed Return Postal Card.

Continued on page 181

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Adams 440 Grader—Cab and Power Steering.

Adams 220 Grader—Scarifier.

Adams 610 Grader—Power Steering, Scarifier & Cab.

Adams 303 Grader.

Galion 118 Grader—14:00 x 24 Tires.

Galion 450 Grader.

Allis-Chalmers Model D Grader.

2—L-W "C" Tournapulls with GM Engines & Fullpak Scrapers.

3—L-W "C" Tournapulls with Cummins Engines.

4—L-W "D" Tournapulls, all with Excellent Tires.

3—Allis-Chalmers TS-300 Motor Scrapers, Excellent Rubber.

Allis-Chalmers HD-6G Loader, Completely Rebuilt.

Case 1000 Loader with 2 Yd. Bucket.

Case 800 Loader.

Chester Double-drum Sheepfoot Roller, Like New.

Ingram 12-ton 3-wheel Roller, GM Diesel Engine.

Ingram 12-ton 3-wheel Roller, Gasoline Engine.

Huber 7-ton 3-wheel Roller, Gasoline Engine.

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(4) Euclid 6 wheeler 14TDT rubber tired 15.5 cu. yd. scrapers.

(5) Rebuilt TS-24 Euclid twin engine rubber tired scrapers.

(1) Mod. TC-12 Euclid crawler tractor with dozer, used 5 months, rebuilt.

(1) Mod. TC-12 Euclid twin engine crawler tractor with pushblade, rebuilt.

(2) Used TS-360 Allis-Chalmers, 15 cu. yd. Scrapers, good condition, tires good.

(2) Used TS-300 Allis-Chalmers rubber-tired Scrapers, 14 yd. struck capacity. Good condition. 1955 machines.

(1) Used Model 25 Northwest Crane, S/N 18824 (1956). Powered by Murphy Diesel engine, fairlead, tagline, long crawlers, 28" shoes, excellent condition.

(5) Used T35 Shield Bantam Truck, Cranes and Backhoes.

(1) Used Huber Warco Maintainer.

(1) Used Model 88 Parsons Pneumatic Tired Trenching Machine.

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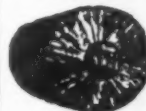
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Complete push-button control with 2 scales, automatic moisture compensator and full electric interlocks.

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RAvenswood 1-5400

### LIMAS FOR SALE

2—44 Limas, 1 cu. yd. machine, long crawlers, wide pads, dragline hoe combination, excellent condition.

1—34 Lima Crane, 3/4 Cubic Yard Back-hoe Dragline combination, excellent condition.

1955 MACHINES

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Sacrifice, \$14,500

Blaw-Knox Batch Plant complete Model P 3100 G Portable 3 Compartment Aggregate and Separate Cement Bins, 33 BR Batcher, C 3 B Batcher, BCPC - 200 Hi Bin and 400 Lo Bin, Electric Bin Signal, 200 Gal. Water weighing Batcher, 50 T.P.H. cement Elevator, 50 T.P.H. cement car unloading under-track screw and truck loading elevator.

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TE 6-6245  
Minot, North Dakota

## HOISTS

### Electric Hoists: 220 / 440 volts, 3 ph. 60 cycles

Capacity	Make
1-Ton	Speedmaster
2-Ton	Yale
4-Ton	Yale
5-Ton	PGH

Suspension  
Chain type, with push button control. Built-in trolley 18' lift, 18 FPM. Guaranteed, rebuilt. Price .....\$300.00 ea.  
Cable suspension, 18' lift, 20 FPM.  
Price .....\$600.00 ea.  
With power trolley, cable suspension, 36' lift, 35 FPM .....\$1750 ea.  
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### AIR HOISTS

1 1/2 Ton Chicago-Pneumatic overhead hoists @ .....\$350.00 each  
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CLEVELAND DITCHER model 85, 12 in. and 16 in. buckets; excellent operating condition .....\$6,000

LORAIN 4 wheel drive gasoline 2 yd. front end loader. Like new! 1,000 hours; closing out line .....11,750

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SCHRAMM 125 pneumatic tractor compressor with back hoe and loader .....2,560

CASE M-3 crawler tractor; fork lift .....3,400

1959 John Deere model 440 IC gasoline crawler with 64 hydraulic tilt and angle blade; excellent condition .....4,900

Allis-Chalmers HD-7 cable controlled dozer, Slusser McLain winch .....2,500

John Deere 420 dozer .....2,800

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#### NEW FACTORY FRESH ★ TRUCK TIRES

New - 1st Line With Complete Road Hazard Guarantee

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#### ★ LOW PLATFORM TRAILER

1st Line, Nylon - Heavy Duty  
8.25x15 - 12 ply LPT. Nylon ..... 71.44 tax 5.00  
8.25x15 - 14 ply LPT. Nylon ..... 77.86 tax 5.39  
10.00x15 - 12 ply LPT. Nylon ..... 83.14 tax 6.87  
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Richlands, Va. - Pikeville, Ky.  
Call Richlands, Va. We credit Long Distance Calls if Purchase Is Made.  
FREIGHT PAID ON 200# OR MORE

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Barber-Greene Finishing Machines, 879-A Series.  
Cleaver-Brooks Hot Oil Booster Units, Model 1A, 5/M 3344-51. Mounted on Ford Truck, complete with hose and couplers.  
Murphy Model 3025 PSR, 30-ton, 25 ft. x 10 ft. Timber Deck Platform Scale w/FCB & SIP.  
Buffalo-Springfield 5-8 Ton Tandem Roller.  
Tampo SP-95 9 wheel, 10 ton, Self-Propelled Rubber-tired roller, sprinkler system & mats.  
Ferguson 3-5 ton Tandem, Steel Rollers, sprinkler system, new mats, Trans. wheels.  
Ferguson Model 2511, 25 ton, Self-propelled Pneumatic-tired roller, 11 wheel, M-M gas engine, sprinkler system and mats.  
Vibro-Plus Model CH-30 Rollers.

(Contact us for our semi-monthly Used Equipment Publication)

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Telephone: ATlantic 341-3127

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1952 H-F Hough PayLoader 3/4 Yd. Recap Tires, Like New. Good Shape. Price ....\$2,200.00

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Ph. ACademy 3-3159

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Joy Model 225 Rotary Drill Rig mounted on tandem White truck, powered by 200 hp Cummings diesel engine, equipped with hydraulic pull down that will interchange with rotary table. Will equip machine with either mud pump or air compressor. Excellent condition. Price .....\$12,000.00

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Any Length, Width or  
Built to Specifications  
We build them a little better for a little less.  
STRICTLY HARDWOOD.

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FLUKER, LOUISIANA

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Aggregate Dryer Model 833  
Barber-Greene dual drum with cold feed  
elevator and two bin hopper, portable  
and in good operating condition. Reason-  
able.

Asphalt Paver, Model 879, Barber-Greene,  
good condition. \$5,500.

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Wind Lake, Wisconsin

Twilight 5-2216 - Twilight 5-6965

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Highest dollar value paid for new and  
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ment. All types of truck equipment  
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**Vandeventer Auto Sales**

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Ph. FRanklin 1-1750

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- 6 LeT. Westinghouse Model D pull.
- 1 Adams 660 Blade.
- 1 Cat 12 Blade.
- 1 Cat D6 Straight Dozer.
- 1 TD14 Angle Dozer.

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Route 2 - Palatine, Illinois  
Phone TWinbrook 4-3458

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**LARSEN and ROMBAS  
Sections**

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**WESTERN SERVICES CORPORATION**

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MArket 4-4000 HUnter 6-4000  
In Florida Call: Port Everglade Steel Co.  
Ft. Lauderdale—JA. 4-6348  
In Houston Call: G. Oliver—GA. 4-7234



This dozer-charged KOLMAN Model 101 is  
scalping out boulders from material being fed  
into crusher. Also very effectively used for  
rejecting fines ahead of a crusher.

The KOLMAN Model 101 Conveyor-Screen  
Plant is available with a wide choice of feed-  
ing accessories which facilitate charging with  
most any type of equipment. The Dozer Trap  
and Feeder-Trap are ideal accessories for  
push loading operations with a bulldozer. The  
Casting Hopper and Feeder-Hopper are de-  
signed especially for top loading with various  
charging units, from front end loaders and  
trucks to shovels and draglines.

Complete flexibility is now also available  
with the Conversion Hopper for Dozer Traps  
and Feeder Traps, making both top loading  
and push loading practical with the same  
plant.

An unusually low equipment investment  
makes possible simultaneous loading and  
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fines with a single-deck, both scalping and  
rejecting at once with a double-deck or grad-  
ing and classifying with the triple-deck vi-  
brating screen.



This Model 101 with Feeder-Trap and Wing  
Walls is equipped with Conversion Hopper for  
top loading with dragline. Hopper is easily  
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charging.

Yes, KOLMAN has the answer for low  
cost, high production screening and loading.  
Complete selection of sizes from 18" to 48"  
belt width, length up to 60', and screens up  
to 5' x 12' on Conveyor-Screen Plants.

Write for Literature

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Sioux Falls, S. D.

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### TRACTORS:

- A-C Model HD58 W/radiator mounted GN  
Hyd. Angledozer and Carco E Winch.
- A-C Model HD20H W/pusher plate and 26"  
cut-out shoes.
- Cat Model D8 W/24" shoes & Cat #25 PCU.
- Cat Model D W/24" shoes & Cat #25 PCU.

### GRADER:

- A-C Model D w/10' Moldboard, four 7:50 x  
20 rear tires, two 7:00 x 20 front tires, std.  
front axle. Mechanical circle shift.

### SCRAPERS:

- 3—LeTourneau Model AT Scrapers w/24:00 x  
29 tires. Excellent mechanical condition.
- 4—Euclid 25FDT Tractors w/58W Euclid Trail-  
ers w/21:00-24 rear and trailer tires. Cum-  
mins Diesels.

### DRAGLINES:

- Unit 1020—¾ yd. Dragline on crawlers.
  - GM 371 Diesel, 30 foot boom. (Backhoe and  
shovel front available at extra cost). Fair  
Condition.
  - Unit 1520—¾ yd. Dragline, Self propelled, on  
rubber, 1 yd. bucket, 30' boom, GM 371  
Diesel. Fair condition.
- Except where noted, this equipment is in  
good to excellent condition.

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Lorain Truck Crane, 30 Ton MC-524, Excellent Condition, Waukesha gasoline engines, 100 ft. Boom, 25 ft. Jib .....	\$31,000
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Case Model W-10 Terraloader, Demonstrator .....	15,950
Case Model 600 Angle Dozer, Demonstrator .....	7,500
Case Model 420B, Loader and Backhoe, Demonstrator .....	6,250
Case Model 600B, Angle Dozer, Demonstrator .....	9,500
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Case Model W-9-D Terraloader, Demonstrator .....	10,950
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Case Model 310 Loader, Overhauled .....	2,500
Rex 5 Yard Mixer, Excellent .....	4,000
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80A Lorain Hoe Attachment, Complete .....	4,500
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1024 A-W Jaw Crusher, Roller Bearing.....	\$2,000
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New Government Surplus Paving Forms

2,000' of Rex 13" x 14", 340% per 10' section;	
4,230' of Rex 14" x 16", 364% per 10' section;	
3,250' of Rex 19" x 20", 495% per 10' section .....	\$34,425.00
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55 net tons of new Dowell Pins to fit these forms .....	2,750.00
	\$38,994.00

This material is priced at one-half of the Government's cost of \$77,988.00, f.o.b. cars, Kansasville, Wisconsin.

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#### Concrete Plant

Butler 6 yd. AUTOMATIC BATCHER. Type MR 7, 100 yd. cap. per hr. Complete w/all accessories, like new condition, less than 2 yrs. service. Purchase Price now \$90,000. Will Sacrifice \$37,500.

PIPER AIRPLANE MO. PA 22 Tripacer, 10 hrs. since major overhaul & relicense at expense of \$1,816. Never damaged. A-1 Cond. Wholesale at \$3,650.

Also Truck Cranes, 10 to choose from. 10 to 35 ton cap. Crawler Cranes—8 to choose from, 25 to 60 ton Capacity. Grade-all, Diggers, 8 x 6 Trucks w/dumpcrete bodies, 3 small truck mounted backhoes, 15 ton end dump Euclids.

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L. E. Lawrence

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CAT 70 Scraper, Large Tires .....	\$5,750.00
LaPLANT CHOATE C108 Scraper .....	1,750.00
LETOURNEAU LS, LP, and FP Scrapers, Each .....	2,750.00
BUFFALO-SPRINGFIELD S-8 Tandem Roller .....	3,650.00
BARBER-GREENE 705B Ditcher .....	1,750.00
PARSONS 88 Ditcher, Rubber Tired .....	1,750.00
FREUNAU 30 Ton Lowboy .....	2,750.00
AMERICAN 28' Oil Field Float .....	900.00
MYSTER D6N, D7M, CARCO F, winches .....	
LORAIN 41, Shovel Front, NEW and Complete .....	1,000.00
2 GMC, 620 Tandem 13' Dumps, Ea. ....	2,200.00
CAT D13000 POWER UNIT 48, Complete .....	1,875.00
GM 6-71 POWER UNIT complete .....	1,500.00
GM 6-110, Radiator Fan to Flywheel .....	1,500.00
3 NEW 22B, Bucyrus-Erie Booms, Ea. ....	1,000.00
1 NEW Tractor Crane, 18000 x 25 Tires .....	1,150.00
GRACE RUBBER TIRED roller, 10 Wheel .....	950.00
3 CATERPILLAR 25 DDPUC, Ea. ....	1,250.00
KEYSTONE 32' TANDEM Platform Trailer .....	1,380.00
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## SALE OF REPOSSESSED CONSTRUCTION EQUIPMENT

TRUCK CRANES  
TRACTORS, DRAGLINES,  
SCRAPERS, GRADERS,  
COMPRESSORS, MIXERS,  
TRENCHERS, BACKHOES,  
PAVERS, BATCHERS, ETC.

Located in

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### Completely Rebuilt Used Machinery

#### MODEL 25 NORTHWEST

Serial #18520, Murphy Diesel Powered.

#### 1 YD. LORAIN SHOVEL

Completely rebuilt, Caterpillar. Diesel Powered.

#### 600 FOOT

#### GARDNER DENVER

GM Diesel Engine.

#### TAMPO

#### PNEUMATIC ROLLER

11 wheel, self propelled, Oliver powered.

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SH 4-2311

3501 Sanborn—Amarillo, Tex.

DR 6-5656

E. Hi Way 89—Odessa, Tex.

FE 7-3596

## FOR SALE

### "3" AXLE LOW-BOY TRAILER

Call or Write

Phone LE 2-2705

### LAURENCE-TRAILER MFG.

2662 W. 28th St.

Grand Rapids, Michigan

### FOR SALE

- 2—Asphalt Plants with 8,000 lb. Mixers
  - 1—Asphalt Plant Continuous Mix (approx. 120 tons per hr)
  - 1—Parsons Trencher Model 250
  - 1—Parsons Trencher Model 310
  - 2—Buff-Spring Tandem Asphalt Rollers 8 to 10 ton
  - 1—Cation Tandem Asphalt Roller 8 to 10 ton
  - 1—Barber-Greene Finishers 870A
  - 1—Cat. D 8 Tractor with Wood Roadmixer Model 54
  - 1—Barber-Greene Bucket Loader Model 543
  - 1—International TD 18 Angledozer
  - 1—International TD 14 Bulldozer
  - 2—Bucyrus-Erie Cranes Model 22B
  - 1—Backhoe for HS 15D
  - 1—BMCO SP Roller
  - 2—International ID 9 Wheel Tractors
  - 1—Cat. Motor Grader, Model 12, Serial No. 7T-410
  - 1—Cat. 2 1/2 Front End Loader, Serial No. 10A22
  - 1—Aerotron 2-way Radio Set (Base Station and 5 Mobile Units)
  - 6—1958 Ford F600 Dumps
  - Several 1950 and 51 Pickups
- For further information, please contact:  
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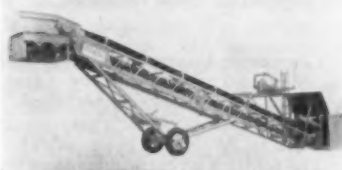
Continued from page 168

## Portable Stabilized Base Mix

Two portable stabilized base mix units have been announced by Peerless Conveyor and Mfg. Co.

The first is a bin type unit and consists of a basic five-yard surge bin with 23 ft. 9 in. belt conveyor discharging into either single or twin mixing pugmill. Bin is charged by highloader, shovel, clam, or dump truck. Aggregate feeds by gravity onto the conveyor belt for discharge into pugmill.

The second is a portable conveyor unit type and consists of a Series 3000 40-foot portable belt conveyor unit with combination dozing trap and reciprocating plate feeder, and either



Peerless Portable Stabilizer

single or twin mixing pugmill. This type unit is usually charged by dozing the aggregate over the dozing trap grizzly. From there it falls on the plate feeder, resulting in a measured, even load on the conveyor belt for delivery to the mixing pugmill.

Special features are: Choice of single or twin shaft pugmills with capacity up to 500 tons per hr.; positive, uniform mixing of aggregate; exact, easy moisture control; complete mobility; an additive blend-in arrangement; hydraulically adjusted elevation; conveyor lengths to 60 ft. and belt widths up to 42 in.

Peerless Conveyor & Mfg. Co., 3341 Harvester Road, Kansas City 15, Kansas.

For more details circle 162 on Enclosed Return Postal Card.

## Blacktop Compacting

Interest in the deep bituminous type of road widening—6 to 12 in. thickness—Jackson Vibrators, Inc., of Ludington, Michigan, has developed a method of compacting the blacktop in these proj-



Jackson Compacting Methods

ects which is said to be more efficient, convenient and economical.

The complete rig for performing this operation consists of a Jackson Multiple Compactor with a new side-towing device to which are attached three compactor units in tandem. This follows the spreader, which is also equipped with a Jackson side-towing device, towing two Jackson vibratory compactor units. In this manner compaction of blacktop in 6 in. (loose) layers, 5 in. (compacted), can be achieved in one pass of the equipment. Water tanks mounted on the Multiple Compactor tractor and the spreader supply water for a spraying device which prevents the blacktop from sticking to the compactor bases.

Jackson Vibrators, Inc., Ludington, Mich.

For more details circle 163 on Enclosed Return Postal Card.

## Hydraulic Accumulator

Three functions are performed by a new oil-hydraulic accumulator released by Crescent Hydraulic Co. One is that of a power storage chamber so a low volume pump can supply a large amount of energy for a brief moment. The second is that of a pressure compensator to maintain system pressure so holding cylinders do not lose their grip. The third is to eliminate surges and vibration, smooth out pressure pulses and prevent shock from fast-closing valves.

Weldless steel outer shell is made in one piece by spin-forging. Hollow aluminum piston is statically balanced



Crescent Hydraulic Accumulator

and includes double Quad-Ring seals. It is proportioned to dispense a maximum amount of fluid with a minimum gas charge and no danger of pressure lock. Connection to a hydraulic circuit is made at a pipe-threaded opening. The gas is introduced through a valve covered by a protective cap. This valve has a safety lock to prevent accidental discharge.

Crescent Hydraulic Co., 1303 Otsego Rd., Allegan, Mich.

For more details circle 164 on Enclosed Return Postal Card.

## New Backhoe Line

A newly designed line of backhoes has been introduced by the Windsor Pippin Corp.

The model 260-H and the 360-H are for use with light or medium tractors and medium or heavy tractors respectively. The re-designed Pippin line now features a chrome-nickel molybdenum boom bracket; improved hydraulic cylinders for increased digging power and S.A.E. 4130 hardened bosses.

Windsor Pippin Corp., Windsor, Vermont

For more details circle 165 on Enclosed Return Postal Card.

## Convenience Comfort, Economy Anywhere in ST. LOUIS

**HEART of ST. LOUIS**  
108 N. Kingshighway  
Facing beautiful Forest Park  
**Hotel**

**Ambassador**  
One of St. Louis' finest hotels  
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Two bks. from Busch Stadium  
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250 rooms with bath.  
Air-Conditioned.—T.V.  
Rates from \$5.  
Free Parking.



**FREE PARKING**  
B. H. TUREN HOTELS

## Manufacturers' Literature

**TUBING HANDBOOK:** A comprehensive new manual on welded steel tubing, including the latest engineering and design data in the manufacture and fabrication of electric resistance welded carbon and stainless steel tubing, has been published by the Welded Steel Tube Institute, Hanna Bldg., Cleveland, Ohio.

Entitled "Handbook of Welded Steel Tubing", it details the newest technological advances made in production and fabrication of welded steel tubing. The handbook compiles engineering data as an aid in simplifying the work of architects, designers, engineers and fabricators of all types of tubular products.

For more details circle 166 on  
Enclosed Return Postal Card.

**ROTARY COMPRESSORS:** Latest models of Davey 600 cfm. rotary compressors are described in a new bulletin released by the Davey Compressor Co., Kent, Ohio.

Contents include a comprehensive outline of operating principles of the Davey multiple stage rotary compression system, with emphasis upon "Perma-Vane" blades. The bulletin contains Model 600 specifications for 4-wheel and skid mounted machines.

For more details circle 167 on  
Enclosed Return Postal Card.

**HAND TOOLS:** A complete selection of hand tools and equipment for builders is included in the new 64 page illustrated 1961 catalog from the Goldblatt Tool Co., Kansas City 61, Mo. The book pictures and describes over 1,000 machines and hand tools used by general contractors and trowel trades contractors. New concrete finishing tools and equipment and portable masonry saws are among the many included.

For more details circle 168 on  
Enclosed Return Postal Card.

**TRENCHER TEETH:** A new two-color, 4 pg bulletin on the Pengo products has been released by the Petersen Engineering Co., Santa Clara, Calif.

The pamphlet describes Pengo trencher teeth for earth augers. Pengo teeth are reported to be safe and easy to change and have long wearing life. Shanks and "wisdom teeth" are illustrated and discussed.

For more details circle 169 on  
Enclosed Return Postal Card.

**DIRECTIONAL CONTROL VALVES:** New CM11 series multiple unit valves for use on hydraulically operated mobile equipment are described in an 8 pg. bulletin available from Vickers Inc., Div. of Sperry Rand, Detroit 32, Mich.

These valves are reported available in any number of sections up to 10,

with individual load checkers in each section. They are rated for operation to 2500 psi.

For more details circle 170 on  
Enclosed Return Postal Card.

**REPLACEMENT PARTS:** Manganese steel replacement parts for crushers, tractors and shovels are shown and discussed in a broadside publication from Columbia Steel Casting Co., 933 N.W. Johnson, Portland, Oregon. The publication gives detailed information including drawings, weights and dimensions.

For more details circle 171 on  
Enclosed Return Postal Card.

**CORROSION CONTROL:** A new illustrated folder describing the various corrosion control systems perfected by Truscon Laboratories 1700 Caniff, Detroit 11, Mich., has been published.

The folder is a practical guide to primary protection and preventive maintenance of all metal surfaces subjected to (1) chemical attack of acids and alkalis, (2) fumes and gases, (3) active industrial solvents, and (4) severe industrial weathering.

It provides complete details on the principal Truscon protective systems.

For more details circle 172 on  
Enclosed Return Postal Card.

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### *Miramar* and NEW TOWER

California's World Famous Resort overlooking the Blue Pacific where Wilshire meets the sea. Twenty minutes from International Airport. 450 luxurious rooms and bungalows, all with television and radio. Complete convention facilities. Banquet rooms for up to 2,000, air-conditioned. Exciting new Venetian Room and Cantonese Room. Swimming pool . . . Beautiful grounds and landscaped gardens. Rates from \$8.

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Washington, D. C. Hotel RALEIGH

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Pittsburgh, Pa. Hotel SHERWYN

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CHICAGO MIDWEST HEADQUARTERS  
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World famed hotels—Teletype service—Television

**MATERIAL HANDLING EQUIPMENT:** A series of product information catalogs that contain condensed detailed descriptions of the Econobile jobsite materials handling vehicles are now available.

Sheets on American Road's model 600 and 620, available from American Road Equip. Co., 4201 N. 26th St., Omaha, Neb., include basic unit information and data sheets containing a photograph, specifications and other technical data.

For more details circle 173 on  
Enclosed Return Postal Card.

**ARC WELDING:** Information concerning a full line of arc welding products is compiled in a 40 page 2 color booklet containing elaborate graphs, charts and illustrations from the Lincoln Electric Co., Cleveland 17, Ohio.

The booklet presents information on AWS electrode classifications and discusses correct electrode selection for every type of welding application. Arc characteristics, welding procedures and physical properties are listed for each electrode including stainless steel, cast iron as well as those designed for mild and low alloy, high tensile steel welding.

For more details circle 174 on  
Enclosed Return Postal Card.

**CONCRETE DAMPPROOFING:** A new catalog is available covering the entire subject of dampproofing, above and below grade, interior and exterior, for brush, trowel or spray applications of mastic or semi-mastic types of bituminous coating for concrete or masonry. Available from A. C. Horn Co., 2133 85th St., North Bergen, N. J., each type is fully described together with its function, method of application and coverage.

For more details circle 175 on  
Enclosed Return Postal Card.

**CLASSIFYING DEVICE:** The availability of a new 4 pg. bulletin describing the Wemco sand-clone was announced by the Wemco Div., Western Machinery Co., 650 Fifth Ave., San Francisco 7, Calif.

Operating principle of this classifying device is described in detail and flow-sheets on its use in washing and desliming, recovery of fine fractions and recovery of water applications are also shown.

For more details circle 176 on  
Enclosed Return Postal Card.

**CONCRETE PAVING:** A recently revised version of the publication on "Cement Pavement Design for Parking Areas" has been published by Portland Cement Assoc., 33 W. Grand Ave., Chicago 10, Ill. The main portion of the booklet describes methods of design and construction of concrete parking areas that will give the most economical pavement and satisfactory service. A section listing suggested specifications for construction is included.

For more details circle 177 on  
Enclosed Return Postal Card.

**WELDING COURSE:** A new specialized training program is being offered by the National Technical Training Services, 260 Delaware, Buffalo 2, N. Y. Scope of instruction and application for the course are described in literature from the organization.

The 14 lessons are described as covering inspection and quality control, both basic and advanced, inspection functions and requirements, and codes, specifications and standards.

For more details circle 178 on  
Enclosed Return Postal Card.

**GROUTING METHODS:** Text and photographs explain the proper methods for grouting the different types of heavy industrial equipment in a 8 pg. publication from Master Builders Co., Cleveland 18, Ohio.

Non-Shrink Emeco Pre-Mixed grout is used to explain preferred grouting methods and techniques. The preparatory steps, forming, selecting materials, mixing and placing the grout are seen in accompanying diagrams, charts and photographs.

For more details circle 179 on  
Enclosed Return Postal Card.

**ADJUSTABLE SPEED DRIVES:** A 6 pg. bulletin outlines an extensive line of adjustable speed drives from the Louis Allis Co. for applications in the  $\frac{3}{4}$  to 2500 hp. drive range. The folder describes four types of complete packaged adjustable speed drives and gives details on available ratings, speed ranges and standard and special modifications.

For more details circle 180 on  
Enclosed Return Postal Card.

## With The Manufacturers

**CATERPILLAR TRACTOR CO.:** In recognition of its "National Goals" advertising program to stir public awareness of the country's growth needs in various fields, Caterpillar Tractor Co. has been awarded the 1960 George Washington Honor Medal by the Freedoms Foundation at Valley Forge. The award is considered one of the top recognitions in the national advertising fields.

**ALLIS-CHALMERS:** A new training center providing a factory supervised training program for Allis-Chalmers construction machinery dealers' service personnel has been completed at the firm's Springfield, Ill. plant. First training sessions began during mid-March. Latest instruction methods are being utilized to bring the factory training service to the dealer.

**U.S. STEEL:** George H. Potts has been appointed assistant to the president of U.S. Steel homes division, that company announced. A graduate of the Harvard Business school, where he received his masters degree, Potts served in the Army during WW II and was recalled to service during the Korean conflict.

**FAFNIR BEARING CO.:** C. G. Rosen-seig, president of Fafnir announced that the company was celebrating its 50th anniversary this month. The company plans to recognize this fine milestone through special activities. One of these will be an open house in the spring of the year.

**ARTHUR G. MCKEE:** This international engineering and construction firm announced that it had acquired the Western Machinery Co., whose headquarters are in San Francisco. Western Machinery comprises three divisions: Western Knapp, WEMCO Div., and the Distribution Group.

**CONSTRUCTION MACHINERY CO.:** Appointment as vice-president and general sales manager of Joseph C. Hamilton was recently announced by that company. Prior to the promotion he has served as sales manager in Canada, and distributor manager in organizations handling CMC equipment.

**OLIVER CORP.:** Robt. W. Bird has been named assistant to Samuel W. White, Jr., new president of the Oliver Corp., headquartered in Chicago.

A native of Beloit, Wis., Bird has been with Oliver since 1950, serving as assistant director of industrial relations. Bird served with the U. S. Army, WW II, three years of which time was spent as director of criminal investigation in Italy.



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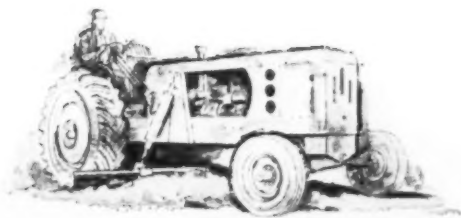


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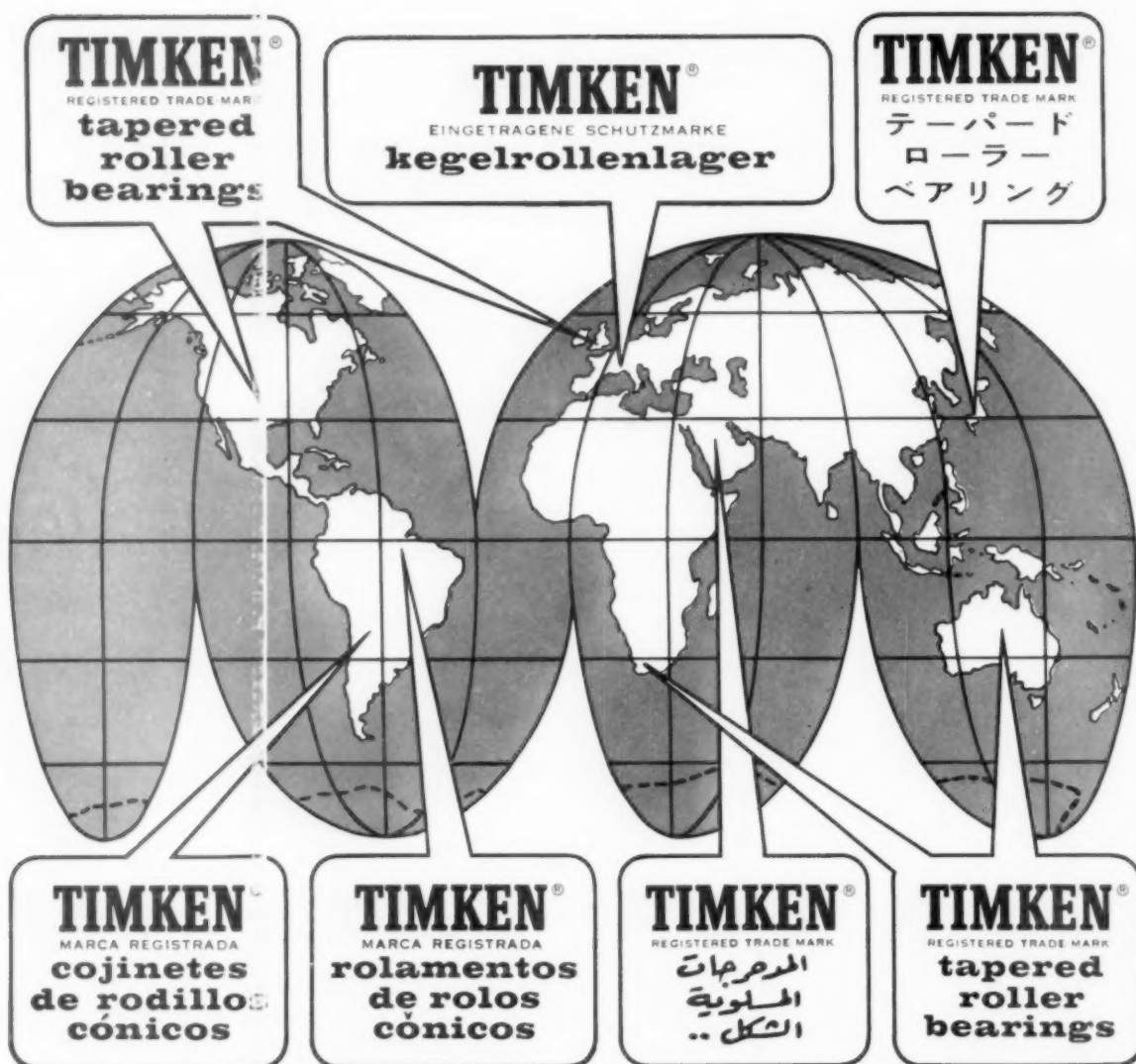
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nine machines  
in one*



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